Gas Journal

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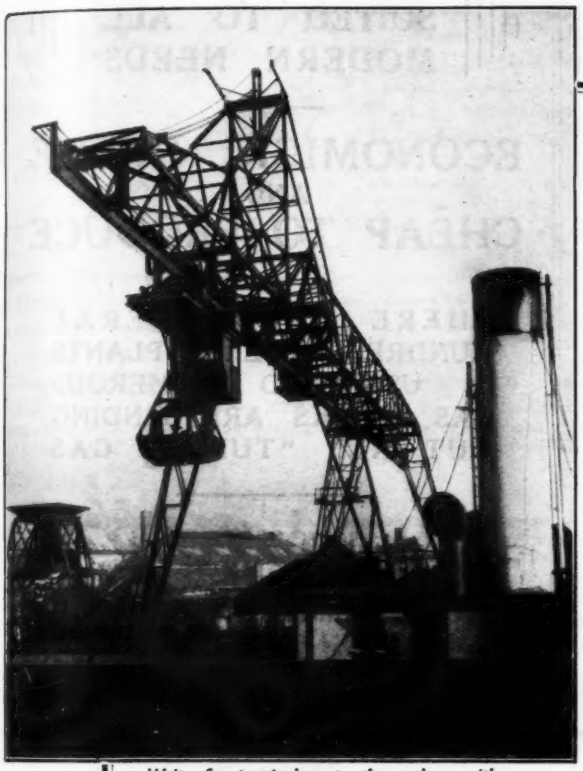

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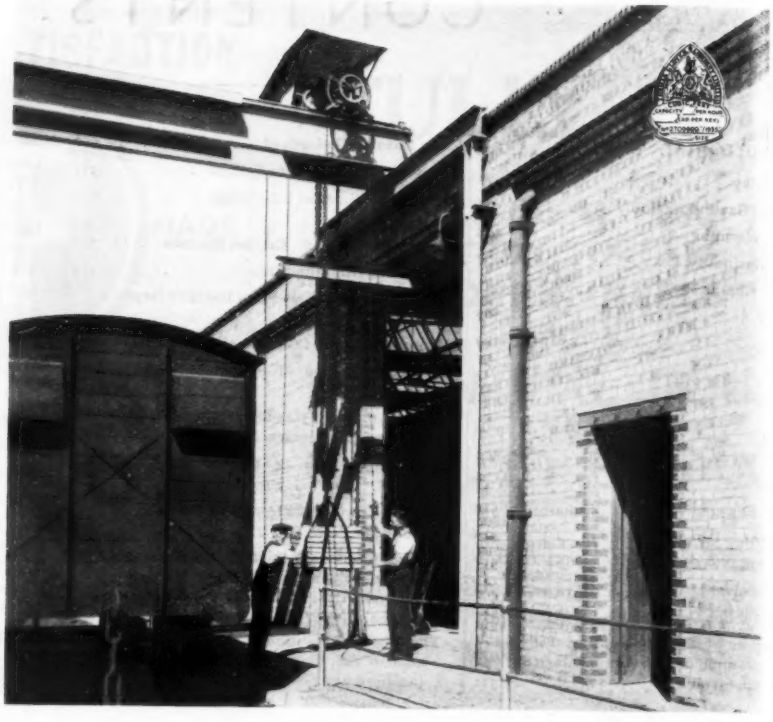

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Gas Journal

SEPTEMBER 4, 1935

Vol. 211. 87th Year No. 3772

Editorial Notes

A B.G.F. Display

That the Exhibitions Committee of the British Gas Federation are determined to put up a good show on behalf of the Industry at the forthcoming Shipping, Engineering and Machinery Exhibition, which opens at Olympia on Sept. 12, is evident from some advance particulars which we are able to announce in regard to the gas display. This is, of course, their first effort on a large scale, and as such it will be awaited with considerable interest by the Industry as a whole. The nature of this exhibition makes it only natural that the display should be entirely devoted to industrial applications of gas, and for this reason the various Industrial Gas Development Centres have been responsible for much of the detail work. They will, in fact, be contributing not only examples of industrial gas equipment with which they are particularly concerned, but also the personnel to staff the display. No fewer than a dozen expert technical representatives will be in daily attendance on the stand throughout the period of the exhibition, in addition to operatives from various outside firms who will be carrying on continuous demonstrations of various processes.

There is no need for us at this stage to go into any details in regard to the actual layout of the gas stand or to name any of the individual appliances to be shown. But we may mention that the gas exhibit will occupy a prominent position on the first floor of the Grand Hall at Olympia, fully visible from the main entrance doors, and that it will cover a floor area of some 7,000 sq.ft. The exhibits will be sectionalized into groups representative of various phases of industrial gas processes. The equipment will be largely connected with the heavy industries and with heat treatment processes generally, including a wide variety of gas furnaces, metal-cutting plant, glass-blowing appliances, and so forth. There will also be examples of smaller apparatus for laboratory or research work, in addition to an information bureau. Indeed, the exhibit as a whole will undoubtedly represent one of the finest displays of its kind ever staged by the Gas Industry.

Gas undertakings generally will do well to encourage industrial consumers, both actual and potential, to visit the exhibition in order to learn of the many ways in which gas can be of service to them. With this end in view, the organizers of the exhibit have not only provided undertakings with suitable posters and other publicity matter concerning the exhibition, but have also made available large numbers of complimentary tickets for distribution. It is up to the Gas Industry in this way to make the fullest possible use of its own exhibit.

The Control of Gas Production

In these notes last week we commented upon the interesting contribution by Mr. T. H. Prater (*ibid.*, p. 464) which indicated what can be accomplished by a balanced outlook on, and close attention to, works control. We feel it is worth referring to this matter again because herein may lie the solution to one of the outstanding paradoxes which the Industry has to face to-day.

A virile and progressive Gas Industry depends upon attracting to its service young men who can see ahead of them prospects of a successful career; and the Industry through its education schemes and through co-operation with the Universities is encouraging the training of such men. Yet at the same time the Industry is going through a phase of extensive grouping. Manufacturing plants are being shut down. Centralized control is tending to reduce the scope of individual gas engineers and their staffs.

We are not here questioning the value of these developments for the common good; we are merely looking at the grouping of undertakings from the particular angle of its effect on the opportunities which are available for young men in the Industry. To take full advantage of the savings which follow close control of gas production, it is necessary that well trained staffs should be available; and it is not universally recognized that the allocation of a technical man to any but the smallest carbonizing plant affects the cost of gas production by a negligible amount and in many cases saves money.

No better training for ultimate positions of responsibility can be found than by the study of minute detail which is involved in the successful control of gas production. We therefore hope that one outcome of grouping may be an increase in the technical staffs for common service within the groups. So may be served the double purpose of encouraging the supply of trained men into the Industry and, by attention to detail, improving the general efficiency of gas production. This same principle of the increased employment of technical men could with advantage be applied in gas distribution and utilization.

To advance, the Gas Industry must be continually on the watch for new fields to conquer and must be receptive of new ideas. It must combine the wisdom which comes from age with the enthusiasm of perpetual youth. For this reason alone the Industry must see that, whatever changes come in its organization, opportunity and encouragement await those who are being trained for its service.

Coke for Soil Warming

THOUGH it is acknowledged that England is no longer an agricultural nation, there exist nevertheless a large number of interests whose livelihood is dependent still upon the soil. Of these, the nurseryman and market gardener constitute no small proportion, and that the Gas Industry, through its chief by-product, is able to assist them in increasing their crop yields will be of considerable interest to many. The Industry has on several occasions in recent times been under a debt of gratitude to the London and Counties Coke Association for the success with which they have advocated equipment designed specifically to increase the market for smokeless gas coke. Another instance is the subject of an article on later pages of this week's "JOURNAL"—namely, the soil warming system which has been installed at the Hertfordshire Institute of Agriculture, near St. Albans.

Experience and research have proved that soil warming provides the best conditions for the growing of several varieties of plants, while the idea has been proved in practice to be economically sound. Indeed, remarkable results of increased yields have been obtained with soil warming, both under glass and in the open bed. The Hertfordshire Institute of Agriculture is a training ground for farmers and nurserymen of the future, so that the success which has attended the experimental installation of coke boiler equipment for soil warming here should be of no little value potentially to the coke market in time to come. With soil warming there is no reason why certain crops which have hitherto been raised under glass should not be grown equally well in warmed soil in the open. It is estimated that the cost of a complete coke boiler installation to cover an acre would be less than one-sixth of that required for corresponding glasshouses. Running costs are obviously dependent upon the weather; but it has been proved conclusively that they are but a fraction of those involved in the operation of glasshouses covering a similar area.

There is a useful outlet for gas coke for soil warming in most undertakings' areas, and the possibilities of this new field will be watched with interest now that the London and Counties Coke Association has helped to set the ball rolling in this particular installation.

Training for Business

WE have followed with much interest the progress of the Department of Business Administration which was established at the London School of Economics in the University of London in 1930. In that year a number of business firms pledged their financial support for a five-year experiment in training university men and women for business careers. The object of the scheme was to overcome some of the difficulties which in the past have hampered the training of future executives in business principles and methods, and as a bridge between business and the universities it has been deservedly welcomed by a number of industries. On the one hand, candidates under the scheme must be university graduates who have just taken their degrees, and their personal qualifications must be high. On the other hand, the scheme has proved to offer the right man a valuable opportunity. From the start business men have played an active part in the work of the Department, taking a share in the responsibilities of management, advising in the method of training and investigation, and in the appointment of staff and the selection of students.

Now, in view of the success of this five-year experiment, the Governors of the London School of Economics have decided to make the Department an integral and more permanent part of the work of the School; and in this decision they are supported by the business men associated with the management of the venture, which has demonstrated the existence of a demand on the part of students for specialized training for higher business posts and on the part of business for such students when trained. It has also proved that such training, based to a large extent on the problems and practice of business and on material gathered from current business operation, can successfully be carried out in a university institution at a post-graduate level. Several of the business firms which contributed towards the cost of the original experiment are continuing their financial support of the Department, and additional firms are also assisting.

A number of firms now favour the Department's University Scheme as a means of recruiting graduates. Some firms are in a position to offer appointments each year. By the scheme a firm selects a graduate for appointment and requires him first of all to complete the one-year course. Other graduates who pass a Selection Committee and are admitted to the one-year course find little difficulty in securing suitable business appointments during the session. For the coming season, October, 1935, to June, 1936, a Leverhulme Scholarship of £200 is offered to enable a university man or woman to attend the course, and four bursaries equivalent to complete remission of fees are also offered by the London School of Economics. The subjects comprise marketing, production, and business finance, and deal with statistics and accounting and the principles of personnel management from the point of view of executive control. Methods of sales promotion and price policy are also dealt with. A further feature of the course is a series of discussions opened by leading business men.

The Standing Charge

THE Gas Industry has still under consideration the vital question of methods of pricing, involved in which must be that fundamentally important factor, the "standing charge." There may well be other "belles," but a multi-part tariff must always have its own attraction, because of the low commodity charge which it makes possible. Who is there that does not, in going about, time and again hear allusions to electricity for domestic purposes at a fractional part of a penny per unit, without even the faintest suggestion of the standing charge which almost certainly lurks in the background? The child who is "seen, but not heard," is left far behind; the standing charge so often is not even "seen." And if electricity at a fraction of a penny per unit is talked about, one may be quite sure that it is also thought about. Yes, undoubtedly, the multi-part tariff does possess its own special appeal, though we would have this remark strictly construed as being pro-multi-part tariff, and not anti-any other modern method of charge. We must endeavour to give the Industry's ambassadors a fighting comparison with this electricity at a fraction of a penny per unit. Something as strictly comparable as possible they simply must have, and a multi-part tariff does offer what is required, when it is the basis upon which the current itself is priced out.

Mention of the matter on this occasion arises from a news item that appeared in last week's issue of the "JOURNAL," which was described in our pages as a protest against unfair standing charges in connection with electricity. The protest was contained in a "letter from an anonymous correspondent"—how much these "anonymous correspondents" have to answer for!—resident in the South-West London district, which appeared in one of the evening papers. The writer had been shown an electricity bill by a friend whose house is one of the roomy places built about a hundred years ago.

Because of its size—though the rent and rateable value are very low—there is a standing charge for the service of electricity amounting to £5 5s. a year. This friend has also a supply of gas, which he uses for cooking; and it is plaintively added that there is " no standing charge from the gas company for the privilege of using its gas."

Well, there it is. There is no need for us to take up the cudgels on behalf of the electricians, who are very well able to look after themselves; but the point happens to be one that touches the Gas Industry also. Even in the particular instance quoted by the correspondent, what is the real difference between the methods of the two public utilities? Surely, only this: That the one charges separately for the service and the commodity, while the other includes the two things in one charge. Our good friends the electricians must not be permitted the advantage which would accrue from a belief that the standing charge is merely superimposed upon the price of current; it is *part* of the charge for current, to the extent that that current would have to be priced out at a higher rate, were the standing charge omitted, in order to retain the supply upon an economic basis.

A Fair Basis?

But the *crux* of the correspondent's protest evidently is that, because of the size of the house, his friend's standing charge works out at £5 5s. a year. On the other hand, being quite old, the rateable value is very low, so that had this been the basis of charge his friend would have got off comparatively lightly—and, presumably, there would not in that case have been any " protest." Upon the rateable value basis, the small, elaborately equipped modern house in the most highly rated neighbourhood would have the greater standing charge, irrespective of the probable lesser requirements in the way of light and heat for the smaller premises; and then the " protest " might have been anticipated from that quarter. The truth is, of course, that even the best regulated standing charge must have its inequalities, however fairly it may work out on the average.

This is the case with other services, where nothing is heard of protests. For example, if one travels, the distance involved is accepted as the basis of charge, and the small, thin man never thinks of claiming that his big, fat fellow man should pay more than he, because of the possession of these attributes. In strict fairness, no doubt he should do so, but think of the trouble and delay and congestion that would be involved in putting upon the scales every omnibus or railroad passenger, before issuing to him (or her) a ticket. No, we must be content with bases for every day transactions that are approximately fair; and with travel tickets the standard of distance may be accepted as meeting requirements.

It is not of the existence of the standing charge in the case of electricity, or its basis, that we would complain, but of the keeping of it right in the background that is involved in so much of the talk of electricity for domestic purposes at a fraction of a penny per unit. We may be slow to condemn the standing charge, but we must be energetic in keeping it to the front as being *part* of the cost of this current.

Let Us Reflect

A great event is being celebrated, and one in which our own Industry should take especial pride, seeing how closely dependent it is upon the railroad systems of the country. What the Gas Industry would have been today, without the assistance of the railway undertakings, can only be conjectured. Yes, of course, there are the schemes to manufacture gas at the pit's mouth, and pipe it all over the country, but the existence of the railroad tracks has rendered any radical departure of this character unnecessary. Something of the kind would have been essential in other circumstance—or, at any rate, the country would have had to be supplied with gas from coast and water-way towns, as no roads could deal successfully with the quantities of coal required for carbonization.

We have spoken of piping the country through, from headquarters, as it were; but it must not be forgotten that there is bottled gas. Under the conditions we are for the moment envisaging, however, the number of bottles that would be needed would be prodigious, and might even present a traffic problem commensurate with that which would be involved in an attempt to cart the coal by road to the various gas-works. And the coke? Not only has the coal to be got into the works, but there are coke and " other things " to be got out again. In these ways the railways help us, and help us so vitally that close co-operation between gas and railway undertakings should be lastingly assured; while, if the tendencies of to-day should permanently persevere, the time may even come when amalgamations between the two will be broached as a possible move in the direction of more perfect service.

On the occasion of such an event as the Centenary of a railway, therefore, it is fitting that the Gas Industry should be among the first to extend its congratulations; and the Act of Parliament which created the Great Western Railway is now one hundred years old. How few romances have been written which equal the histories of the great national industries, and how few there are among our industries that surpass as examples of brilliant conception, of desperate courage, and of dogged perseverance, the achievements of our railway companies. It stirs one to read of the fights during construction, in which the members of the Parliamentary Bar played so great a part, and of the struggles of the engineers—struggles so frequently from seeming defeat to complete victory. The Great Western Railway, marvellous accomplishment as it may be reckoned, was only one of the engineering undertakings that combined to emblazon indelibly the name of Brunel upon the Scroll of Fame. Work on the main line from London to Bristol was begun in 1835, and the first section to be completed was that from London to Taplow. Then, step by step, overcoming the most formidable obstacles, he persevered. Of these obstacles, and of this perseverance, this is not the place to speak in detail. Suffice it to say that a study of them, such as is presented in the Great Western Centenary Number of *The Times*, must prove an incentive to all who do not consider themselves above taking a lesson from the past. With the survival of the characteristics of the men who built up the national railway systems, the industrial greatness that has been England's in the past hundred years will not desert her in the century that is to come.

Personal

We learn that Mr. A. F. Kelley, B.Sc.(Hons.), Assoc.-M.Inst.Gas E., who has been on the staff of the Chief Engineer to the Newcastle-upon-Tyne and Gateshead Gas Company (Mr. F. P. Tarratt, M.Inst.C.E.), has been appointed to a position on the Industrial Engineering staff of the Gas Light and Coke Company. Mr. Kelley took his degree in Mechanical Engineering at Armstrong College in 1931, and has recently passed the Associate Membership examinations of the Institution of Mechanical Engineers and of the Institution of Civil Engineers.

* * *

The staff and employees of Tamworth Gaslight and Coke Company have presented Mr. R. Ashworth, on the termination of his appointment as Engineer, Manager, and Secretary, with a chiming clock.

News in Brief

Third Prize in the closely contested trade tableau class in the town's carnival on Aug. 31 was gained by the St. Austell Gas Company.

To Meet the Cost of meters, stoves, and mains for the Elgin Gas Department, we understand, the Town Council propose to borrow the sum of £2,000.

The Joint Reading of Gas and Electricity Meters was again considered by the Blackburn Town Council recently. The General Purposes Committee rejected the proposal.

An Intensive Selling Campaign at Port Talbot has resulted in 1,100 modern cookers, for which the Gas Department invited tenders in January last, being sold and fixed.

An Exhibition of Gas Equipment is to be held in the Lecture Hall, Burley-in-Wharfedale, jointly by the Burley Urban District Council and the Otley Gas Company from Sept. 30 to Oct. 4.

Gas Fires are to be installed in two blocks of Council houses by the Leven Town Council. We understand that gas was selected as the heating medium in preference to coal on the recommendation of the Department of Health.

General Approval has been given by the Ministry of Health to the erection by the New Mills Council of a gasholder. Formal sanction, however, has been deferred until revised estimates and other particulars have been submitted.

Application for a Special Order is being made to the Board of Trade by the Newton-in-Makerfield Urban District Council to authorize the Council to erect additional gas manufacturing plant on land recently purchased adjacent to the existing gas-works.

Interim Dividends at the following rates (less tax) are being paid by the Hastings and St. Leonards Gas Company: £7% per annum on the 5% converted stock, £5 10s.% per annum on the 3½% converted stock, and £6 8s.% per annum on the 5% additional stock.

The London Office of the European Gas Company inform us that as from Aug. 29 the effective control of the Company was transferred to Paris, 3, rue de Messine, where all communications should henceforth be addressed. The English Directors of the Company have resigned.

Gas-Works to Garage.—The Transport Committee of the Manchester Corporation decided at a special meeting held recently to convert the Gaythorn Gas-Works site into a garage for the City's 'buses. We understand that the Works have not been used for manufacturing gas for a number of years.

Applications are Invited by the Lea Bridge District Gas Company for the position of Showroom Manager to take complete charge of their chief showrooms under the supervision of the Sales Manager. The position, carrying a salary of £350 per annum, is detailed in our advertisement columns this week.

A Visit was Paid by the members of the Altrincham Chamber of Trade last week to the works of Messrs. Fletcher, Russell, & Co., Ltd., to see the manufacture of gas appliances. The party was joined by representatives from the Altrincham Gas Company, including Mr. F. A. West, the Engineer and Manager.

A Booklet has been issued by Mr. A. McDonald, Engineer and Manager, Motherwell and Wishaw Gas Department, in which he ably points out the advantages of gas for cooking, heating, and lighting. With the publication is included a pamphlet by Prof. William A. Bone, D.Sc., F.R.S., contrasting the merits of gas and electricity.

The Position of Manager of the Newport (Fife) Gas-Works is vacant and the Town Council are inviting applications from persons with a sound knowledge of the manufacture and sale of gas. Further particulars of the position, which carries a salary of £300 with house (free of rates), coal, and light, will be found in our advertisement columns this week.

A New Governor House is to be erected at a cost of £1,800 in Leman Street for the Leeds Corporation Gas Committee.

An Increase in the Price of Gas-Making Coals is feared by the Engineer and Manager of the Widnes Gas Department, Mr. C. E. Dickinson, and on his recommendation the Gas Committee, believing that an emergency had arisen, resolved that he be authorized to make arrangements for the purchase of 50,000 tons of gas-making coals to be delivered during the period from April 1, 1936, to March 31, 1938.

"Star" Chefs of Five Countries famed for their national cookery are planning an exceptional international display in connection with the Hotel, Restaurant, and Catering Exhibition at Olympia next winter. The King's chef, Monsieur H. Cédard, has accepted the office of President d'Honneur of the "Salon Culinaire." Laureates of past cookery exhibitions will combine to show the highest class work on the Table d'Honneur, and competitive classes are being arranged.

Gas Lighting is employed with excellent results at the reconstructed Temple Meads Station at Bristol. The Great Western Railway has completely rebuilt this station and the gas lanterns bearing the name of the City are of modernistic design to harmonize with the new scheme. With characteristic enterprise the Bristol Gas Company have followed up their success with a big advertising programme in the local Press in connection with the Railway Company's Centenary Celebrations.

Petrol from Coal.—According to *The Times* of Sept. 2, Messrs. Coal and Allied Industries, Ltd., who in the last eight months have erected a large plant at Seaham Harbour for the manufacture of petrol from coal, have decided to start immediately on making the foundations for a duplicate of the present plant. The work of preparation on the original plant is so far advanced that the carbonization battery has been lighted up, and it is hoped that the first unit will be in full production by the end of this month. The present plant will use about 500 tons of coal a day, and is expected to produce about 4,000,000 gallons of motor spirit, 4,000,000 gallons of Diesel oil, 100,000 tons of smokeless fuel, and hundreds of tons of valuable by-products a year.

Forthcoming Engagements

Sept.

5.—B.C.G.A.—Yorkshire District Conference at Bradford.

10.—N.G.C.—Central Executive Board Meeting, 2.30 p.m.

9-12.—Association of Public Lighting Engineers.—Twelfth Annual Meeting and Conference.

12.—North British Association.—Annual Meeting at St. Andrews.

12.—Shipping, Engineering, and Machinery Exhibition opens at Olympia.

19.—Wales and Monmouthshire Association.—Autumn Meeting at Portheawl.

19.—S.B.G.I.—Council Meeting at 11 a.m.

20.—North of England Association.—Autumn Meeting at Whitby.

28-Oct. 1.—B.C.G.A.—Annual General Meeting and Conference at Edinburgh.

Oct.

19.—Scottish Junior Association (Western Section).—Visit to Messrs. Thomas Glover & Co., Ltd., Edmonton.

1935 "JOURNAL" DIRECTORY

Page 56. RHYMNEY. J. P. Jones, G.M. & S., retired. B. Grainger appointed E., M., & S.

Page 66. TAMWORTH. R. Ashworth, E., M., & S., resigned.

The British Standards Institution announce that a new Standard Specification (B.S.S. No. 617 of 1935) has recently been issued for the identification of pipes, conduits, ducts, and cables in buildings. This was drawn up at the request of the Royal Institute of British Architects and has been in course of preparation since 1932. The scheme comprises a standard colour and a specially shaped identification plate for each service appropriately stamped with a distinguishing lettering to denote the classes of the service. Copies of this Specification may be obtained from the Publications Department, British Standards Institution, 28, Victoria Street, S.W. 1. Price 2½d., post free.

The Violent Thunderstorms which swept the south and east coasts on Sunday night were responsible for electricity failures over a wide area, including Margate, Broadstairs, and Westgate. In these parts, where the storm was particularly severe, tramcars were brought to a standstill, and it is safe to say that conditions might have become serious in the crowded state of these holiday resorts had not the street lighting been almost entirely by gas, which as usual remained steadfast when all else was in darkness. At the Margate General Hospital, where fortunately no operations were in progress at the moment of failure, the stand-by gas lighting system was brought into use. Electric current failed also in Dover for about fifteen minutes.

New Institution "Grey Books"

The Institution of Gas Engineers has re-issued the Papers presented and discussed at the 72nd Annual General Meeting to include their Introduction, Discussion, Written Contribution and Author's Reply, thus continuing the series of "grey-books" inaugurated at the 71st Annual General Meeting.

The Publications now issued, of which copies can be obtained price 2s. each from the Secretary of The Institution, 28, Grosvenor Gardens, S.W. 1, are as follows:

Publication.

No. 109/14.—"National Policies Governing the Testing of Gas Appliances," by Stephen Lacey, B.Sc., M.Inst.C.E., M.Inst.Gas E., and C. A. Masterman, M.A., F.I.C.

No. 110/15.—"Problems and Answers in the Reconstruction of Manufacturing and Distribution Plant, Nottingham," by George Dixon, B.Eng., M.Inst.Gas E., Assoc.M.Inst.C.E.

No. 111/16.—"The Gas Account," by W. B. McLusky, M.Inst.Gas E.

No. 112/17.—"Development of Gas Sales: Policy and Performance," by Samuel B. Chandler, M.Inst.Gas E., A.M.I.Mech.E.

No. 113/18.—"Waste Heat Recovery from Retort Settings," by Major W. Gregson, M.Sc., M.Inst.C.E., M.I.Mech.E.

No. 114/19.—"The Preparation, Marketing, and Utilization of Coke," by W. L. Boon, M.I.Mech.E.

A Margate Carnival Display

This decorated lorry was entered by the Isle of Thanet Gas Light and Coke Company in a recent Carnival at Margate, and was successful in gaining second prize.

Herne Bay's Jubilee Carnival

This decorated lorry was entered by the Herne Bay Gas Company in the recent local Jubilee Carnival. As can be seen in the photograph, a Parkinson "R.A." gas cooker, similar to that in the King's House, occupied one side of the display, while a gas-operated refrigerator and modern gas fire were shown on the other, together with appropriate slogans.

The Association of Public Lighting Engineers

Programme of 12th Annual Meeting and Conference

The programme for the 12th Annual Meeting and Conference of the Association of Public Lighting Engineers to be held in London from Sept. 9 to 12, 1935, is as follows:

Monday, Sept. 9.

2.45 p.m. Council Meeting in the Georgian Room, Hotel Metropole.
4. o p.m. Annual General Meeting and Transaction of Formal Business in the Conference Room.
8 30 p.m. Reception at the Hotel Metropole (Whitehall Place entrance) by the President, Mr. A. Maurice Bell, supported by Sir Francis Goodenough, C.B.E., and Mr. A. C. Cramb, M.I.E.E. A.M.I.Mech.E. Dance, Cabaret, and Buffet until midnight. (Evening Dress.)

Tuesday, Sept. 10.

10. o a.m. Opening of Conference by The Viscount Elmley, M.P., Parliamentary Private Secretary to the Minister of Transport.
10 30 a.m. Presidential Address by Mr. A. Maurice Bell (Public Lighting Superintendent, Tottenham and District Gas Company).
10 50 a.m. Presentation of Certificate and Badge to the Retiring President (Mr. Alex Forbes).
11. o a.m. Paper: 'Some Notes on Street Lighting Problems and on Directional Lighting by High and Low Pressure Gas Lamps," by Mr. D. Chandler and Mr. A. J. Prestage (South Metropolitan Gas Company).
1. o p.m. Luncheon in the Grand Hall, Hotel Victoria (Edward VII. entrance), at the invitation of the Gas and Electric Supply Industries, with Brigadier-General Sir Henry P. Maybury, G.B.E., K.C.M.G., C.B., R.E., M.I.C.E., Member of the London Passenger Transport Board and Member of the London and Home Counties Advisory Committee, in the Chair.
3 o p.m. Paper: "Developments in Electric Lighting in London," by Mr. W. J. Allbright (South Metropolitan Electric Light and Power Company, Ltd., and South London Electric Supply Corporation, Ltd.).
9. o p.m. Inspection of Lights of London by motor coaches, which will start from the Hotel Metropole.

Wednesday, Sept. 11.

10. o a.m. Paper: "Costs and Statistics of Street Lighting," by Mr Ronald Parker (Sheffield Public Lighting Department).
11. o a.m. Paper: "An Analysis of Modern Views on Street Lighting and their Relation to Visibility," by Mr. F. C. Smith and Mr. K. F. Sawyer (Gas Light and Coke Company).
1. o p.m. Luncheon in the Grand Hall, Hotel Victoria, at the invitation of the Chairman and Directors of the Tottenham and District Gas Company, with the Chairman, Mr. Henry Woodall, J.P., M.Inst.C.E., in the Chair.
3. o p.m. Paper: "Developments in Public Lighting in Germany," by Dr. Ing. Adolph (Berlin Light and Power Company).
7 30 p.m. The Association Dinner and Dance in the Grand Hall, Hotel Victoria. (Evening Dress.)

Thursday, Sept. 12.

10. o a.m. Paper: "The Importance of Kinematical Factors in Roadway Illumination," by Mr. R. Maxted, Mr. L. J. Davies, and Mr. G. S. Lucas (Research Laboratory, British Thomson-Houston Co., Ltd.).
11. o a.m. Close of Conference.
2.30 p.m. Visit to the Port of London at the invitation of the Port of London Authority. Embark at Tower Pier.

Early Days at Chelmsford

This old print, kindly forwarded to us by Mr. F. N. Howes, Engineer and Manager, Chelmsford Gas Department, throws an interesting light on the evolution of the modern gasholder. It shows a very early type which was probably erected about 1820 and, while the "framing" and counter-balancing arrangements might arouse some adverse criticism in these days, the iron tank certainly sounds somewhat less antiquated than 115 years! The quaint spelling of the word gasometer (more a necessity than a misnomer in those early days) is quite in keeping with the antiquity of the print. The meadow full of buttercups, and the ample growth of vegetation, together with the grazing cattle close to the plant, must surely have dispelled any doubts that might have been entertained by sceptical folk as regards the purity of atmosphere in the vicinity of a gas-works.

Proposed Bulk Supply to Salford

On Sept. 19, we learn from a local correspondent, a conference is to take place between representatives of the Salford and Manchester Corporations to consider the offer to supply Salford with gas in bulk.

At the first conference Manchester offered to supply gas in bulk at 1s. 6d. per 1,000 cu.ft. for an approximate supply of 5,000,000 cu.ft. until each Committee had examined its own financial position and had obtained figures.

Salford officials have now drawn up a report in which attention is given to such questions as the future of the gas-works, the cost of supplying gas to consumers, redundancy of staff, and the liability of continuing to supply outside districts.

Salford at present supplies Eccles, Swinton and Pendlebury, Irlam, Worsley, and parts of Prestwich, and naturally their future is directly concerned in the negotiations.

Record Coke Sales at Edinburgh

During the month to Aug. 15 the demand made of Edinburgh Corporation Gas Department for coke for export was unprecedented, approximately 10,000 tons being shipped. This quantity is much in excess of business done during any month in the history of the Department.

A further 4,000 tons are at present being loaded, and the stocks at Granton Gas-Works, which at this time of the year are usually large, are now much depleted, and will be cleared out within the course of the next few days. It is interesting to note that 40 unemployed men have been given work in connection with the loading of this coke, and that the export has been better than it has been for some years past. It is not anticipated that there will be any shortage of coke during the winter months unless the weather is exceptionally severe, but local users are advised not to delay in booking their requirements.

The Department also report that during the month the amount of gas sent out from Granton Gas-Works was 238,850,000 cu.ft., an increase of 5,735,000 cu.ft. over the corresponding month last year.

Athletic and Social

Smith Meters, Ltd., Cricket Success.

Smith Meters, Ltd., Kennington, competing for the "Lyons" Perpetual Senior Cricket Cup under the auspices of the London Business Houses Amateur Sports Association met the Messrs. Kearley & Tonge eleven recently in the final. The final scores were, Smith Meters 91; Kearley & Tonge 78. H. Puttly scored 33 and accomplished the hat trick for Smith Meters, Ltd.

Impressions from the States

Mr. J. H. Wilson has recently returned from a visit to the United States bringing with him some very interesting impressions of the Gas Industry in America.

Mr. Wilson went to the States at the invitation of several prominent Gas Engineers and he spent a great deal of his time with Mr. E. Umstead and his staff at the Works of the Providence Gas Company, Rhode Island.

One of Mr. Wilson's reasons for visiting America was to explain, at their invitation, to American Gas Engineers the trends of modern meter construction in this country, but he tells us that whatever information he may have imparted to his American friends was more than balanced by the ideas and impressions he gained during his stay.

An aspect of gas distribution which struck Mr. Wilson very forcibly was the enormously increasing use of gas refrigerators. Gas refrigerators were at that time being fixed in Rhode Island at the rate of more than a hundred a day, and this state of affairs was common in New York and all over America.

The meter manufacturers in America have not yet, according to Mr. Wilson, adopted the more recent innovations in meter manufacture, but they are fully alive to their possibilities, and Mr. Wilson suggests that any English Gas Engineer who is able to do so can spend some thoroughly enjoyable weeks with the Gas Industry of America. He personally can vouch for their superlative hospitality and natural kindliness, and he hopes to make more than one return visit to his friends in the States.

Cornish Industries Fair

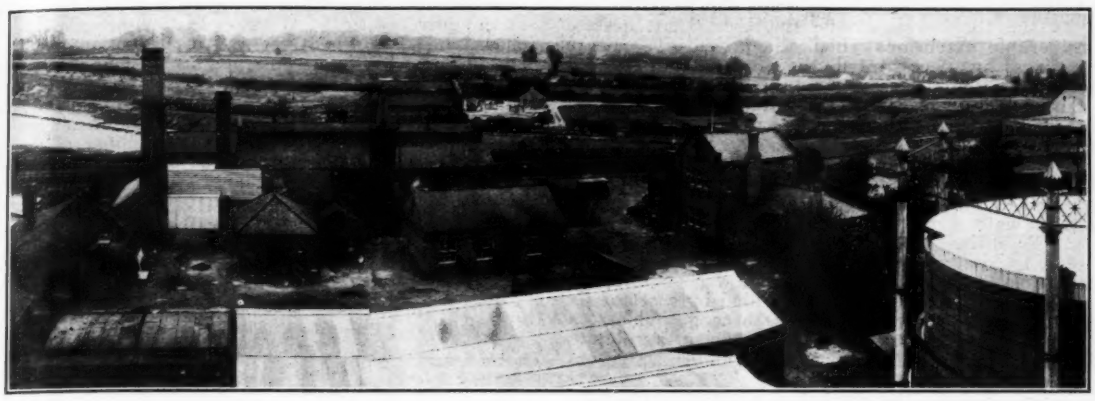
Gas Industry Represented

Nearly fifty industries were represented at the first Cornish Industries Fair, held at Truro from Aug. 28 to 30, ranging from heavy engineering to the making of small souvenirs.

The Cornish Gas Association arranged an attractive display, and the Chairman of the London-Cornish Association (Mr. C. J. Burnard), in opening the exhibition, referred to its special significance in that William Murdoch carried out his early experiments with gas in Cornwall, and by 1795 had successfully lighted his house at Redruth by means of the new illuminant.

In 1872, said Mr. Burnard, the biographer of Richard Trevithick wrote: "Murdoch's house still stands in Cross Street, Redruth; those still live who saw the gas pipes conveying gas from the retort in the little yard to near the ceiling of the room just over the table; a hole for the pipe was made in the window frame. The old window is now replaced by a new frame."

A HUNDRED YEARS OF



A View of the Leighton Buzzard Works from the top of one of the gasholders.

Gas at Leighton Buzzard

In commemoration of their Centenary, the Leighton Buzzard Gas Company have published an interesting brochure tracing the development of the undertaking from its formation to the present day. From this we have extracted some of the episodes which form milestones in the history of a progressive concern.

Early in the year 1835, a number of prominent Leighton Buzzard gentlemen decided to form a Company for the purpose of supplying the township of Leighton Buzzard, and the adjoining parish of Linslade, with "inflammable air or gas" under the title of the Leighton Buzzard Gas and Coke Company.

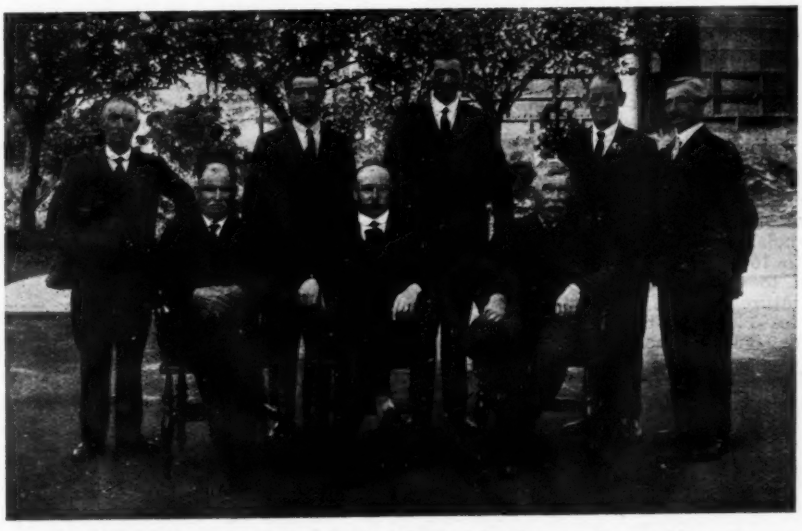
The Company was established by a deed, dated Aug. 28, 1835, and for the sum of £100 a plot of land was secured at the bottom of Billingham Road. On this a very small gas-making plant was erected and placed under the management of a Mr. Matthews. No time was lost in commencing operations, for by the end of 1835 thirty-two private houses and a few street lamps were connected to the Company's mains. From the outset the business was successful, a dividend of 2% being paid for the first year, increased to 2½% in the succeeding year and maintained at that figure for the three following years. In the early years the price of gas was 15s. per 1,000 cu.ft., a figure that was considered very reasonable in those days.

The first change in the management occurred in 1839, when Mr. W. Mellor succeeded Mr. Matthews. Mr. Mellor served the Company for over 40 years.

The original carbonizing plant consisted of three retorts, while the storage accommodation was a single gasholder of 5,000 cu.ft. capacity. For the purposes of comparison, it may be stated that there are, at the present time, 54 retorts in the carbonizing plant, and three gasholders with a combined capacity of nearly half-a-million cu.ft. The growth of the Company's business is also shown in the quantity of coal carbonized. In the first year or two this did not exceed 100 tons per annum; in 1935 it will be little short of 6,500 tons.

A Fortunate Purchase.

The rapid progress of the business called for frequent additions to the plant, and by the year 1880 the Billington Road Works were incapable of further expansion owing to the cramped nature of the site. A new site was therefore sought, and the Directors were fortunate in securing seven acres of land adjoining the Dunstable branch of the then London and North Western Railway. The good fortune lay, first, in the suitability of the site for a gas-making plant and the available transport facilities, and, secondly, in the discovery, during the excavations for the foundations of the new plant, of a bed of excellent sand. The



Employees who have served the Leighton Buzzard Gas Company for over 25 years.

revenue from the sale of this sand went some way towards meeting the cost of erecting the new works.

In 1881 Mr. John Eunson, Engineer to the Northampton Gaslight Company, prepared the plans for new works, the construction of which was commenced forthwith and completed in the following year. Such was the foresight displayed by the Directors and the Engineer, that, despite the considerable extensions which the progressive nature of the business has necessitated, the present works depart little from the original lay-out.

The Company now own a 7½ acre site, on part of which the gas-works stand. Although the make is about 90 million cu.ft. per annum, the plant has a capacity of 25% in excess of that make. It comprises a carbonizing plant of eight settings of horizontal retorts—54 retorts in all—charged by a manual charging machine. There is also a carburetted water gas plant of 120,000 cu.ft. per day capacity. Following the annular condensers and Waller exhausters, the wet purification plant consists of a tower scrubber, Cockey washer, and rotary washer-scrubber, while the dry purification plant is provided by a set of six purifiers. For the storage there are three gasholders; a spiral guided holder of 220,000 cu.ft. capacity, a column-guided holder of 180,000 cu.ft. capacity, and a water gas relief holder of 70,000 cu.ft. capacity.

Coke is prepared for the market in a recently installed coke cutting and grading plant, and tar is prepared for road use in a dehydrating plant.

Distribution.

Gas is delivered into the district through a 15-in. station governors into a 12-in. main which feeds the 23 miles of mains, ranging in size from 12-in. downwards, which supply gas to the consumers. For the outlying district of Wing, some three miles from Leighton Buzzard, where there are 363 consumers, and also for boosting the pressures in the town during periods of peak demand, two steam-driven Reavell compressors at the gas-works deliver gas at a pressure of 3½ lb. per sq.in., through a 3-in. feeder main. The high pressure gas is fed into the low-pressure district mains through governors.

The Board Room, General Offices, and Stores are situated at the entrance to the Works. In 1920 premises were purchased in the High Street and converted into showrooms and offices, which were enlarged and re-modelled in 1930.

The population of the area of supply is about 13,000. In this connection it is to be noted that Leighton Buzzard is a market town and that the population has shown little variation over a long period. The number of consumers is 3,482. In addition to the gas sold, the Company dispose of 2,100 tons of coke and 78,000 gallons of tar per annum. Of its employees, six have been in the Company's service for upwards of thirty years.

Some idea of the growth of the Undertaking during the past 50 years may be gathered from the following extracts:

—	Coal Carbonized. Tons.	Gas Made. Cu.Ft.	Number of Consumers.
1884	1,750	17,200 000	425
1909	4,904	54,423,000	1,920
1934	6,327	91,794 000	3,482

The Company has been fortunate in certain long family associations. The Bassett family was represented on the Board from 1835 to 1934—one year short of the century. The Richmond family has had a member on the Board from 1864 to the present time. In 1884 Mr. C. F. Ruggles was appointed Manager, and in 1890 Secretary. On his death in 1912 his son, Mr. H. G. Ruggles, succeeded him as Engineer, Manager, and Secretary.

The Decomposition of Phenolate Solutions by Electrolysis

K. Drees and G. Kowalski in *Brennstoff-Chemie*, 1935, 16, 268-271 (July 15), refer to the drawbacks associated with the usual method of tar acid recovery. It is shown that the tar acids can be liberated from an alkaline phenolate solution by electrolysis.

The reactions concerned are as follows:

In the electrolyte . $RONa \rightarrow RO' + Na'$
At the anode . . $2RO' + H_2O = 2ROH + O$
At the cathode . . $Na' + H_2O = NaOH + H$

Use of a mercury cathode enables the sodium to be recovered as amalgam. The latter may be decomposed by water, in an external vessel coupled to the cell, with regeneration of a 25% solution of caustic soda which serves for the treatment of further quantities of tar oil.

It was anticipated that difficulties might arise due to anodic oxidation of the liberated phenols. The factors influencing the magnitude of these losses were therefore investigated. The cell employed consisted of a glass cylinder of 4-6 in. diameter. The bottom of the cell was drawn out to a neck of small diameter through which the iron or platinum lead to the mercury cathode was introduced. The sodium amalgam formed during the electrolysis was withdrawn by way of a cock. The anode was of platinum gauze. The cell was fitted with a stirrer, a thermometer, a glass coil for heating or cooling purposes, and a reflux condenser to condense vapours of steam and phenol when experiments were carried out at an elevated temperature.

For the preparation of the phenolate solutions from tar oils or individual phenols, solutions of caustic soda ranging in strength from 4 to 16·6% were employed, the caustic soda being saturated to the extent of 75 to 100% with phenols. The temperature range of the electrolysis experiments was from 30° to 65° C. and the applied cell voltage varied between 6 and 9 volts. These voltages are higher than the minimum voltage required for the decomposition of the phenolates, the reason for the high voltage being that the platinum anode had a smaller diameter than the mercury cathode and that, in experiments in which a diaphragm was employed, the form of the electrode could not be adapted to the form of the diaphragm. The effect was that the distance between the anode and the cathode was excessive, leading to an excessive bath resistance.

The first experiments were carried out without use of a diaphragm. A uniformly low bath temperature is desirable if oxidation is to be minimized. However, in spite of intensive stirring, the anode temperature was higher than the bath temperature since phenolate solutions of high strength have high viscosities even at a temperature of 50° C. Irregularity in the temperature distribution was especially pronounced in the case of cresylate solutions. With increasing temperature, the rate of oxidation increased—not linearly but at a greater rate. With cresylate solutions, their high viscosity prevented a complete separation of the oxygen liberated at the anode and the gas partly collected as bubbles on the anode and thus obstructed the flow of the current. In the experimental apparatus, the resistance of the bath increased and the strength of the current decreased as electrolysis proceeded since, due to their high specific gravity, the deposited phenols settled on the mercury at the base of the cell. To obtain a satisfactory separation of the phenols liberated at the anode, a different arrangement was adopted, the mercury being placed in a diaphragm which constituted a cathode chamber. It was then possible for the phenols to settle on the bottom of the cell whence they could be withdrawn. Under these conditions the resistance of the bath did not rise.

In order to obviate the necessity for increasing the voltage employed, the sodium content of the amalgam was not allowed to exceed 0·5%. Since the mercury was in a state of quiescence owing to the impossibility of stirring it, the inevitable result was that crystals of amalgam having a very high content of sodium were formed in the upper layers of the mercury whereas the lower layers were free from sodium.

The oxidation losses were as follows in the experimental apparatus:

Phenolate Solution from . .	Phenol.	*m*-Cresol.	*o*-Cresol.	*p*-Cresol.	Xylenol.	Coal-Tar Oils.*
Loss, % . .	5–13	7–14	10–20	12–30	17–34	12–16

* 65% phenol, 35% cresols.

In the case of phenol, the oxidation products are completely soluble in caustic soda and water. In the case of the cresols and especially *p*-cresol, a yellow resin was precipitated when the cell fluid, which, after electrolysis,

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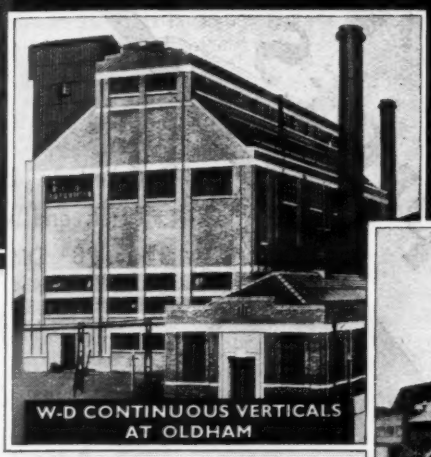
CARBONISATION AND OTHER FUEL PROBLEMS



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still contained 1% of caustic soda, was diluted. Apparently, polyphenols are formed by elimination of hydrogen.

Oxidation was most pronounced in the case of phenolate solutions containing uncombined caustic soda. Oxidation does not proceed at a uniform rate but becomes quicker as the electrolyte becomes more and more impoverished in soda.

A sketch of a large scale plant is given. The mercury employed as cathode circulates through a gently inclined zig-zag diaphragm the slope of which depends on the sodium concentration desired in the amalgam. The amalgam leaving the cell proceeds to a decomposition vessel having an inclined bottom. Here it is treated with water with regeneration of caustic soda. Decomposition of the amalgam may be accelerated by the presence of roughened iron plates or by use of a current of electricity. On issuing from the decomposition vessel the mercury is practically free from sodium. It is returned to the electrolytic cell by means of a pump or bucket wheel. Experiments showed that the sodium of the phenolate solution can be almost quantitatively converted into sodium amalgam and that the amalgam can be quantitatively converted into 25% caustic soda solution. Thus, the large soda losses associated with the ordinary type of tar acid recovery plant are eliminated.

To the above-mentioned oxidation losses which occur in the case of a phenolate solution prepared from tar oils must be added a further loss of about 3% to cover (1) losses when the phenolate solution is steamed to clarify it and (2) distillation losses. The total loss thus becomes 15 to 19%. The oxidation losses can be reduced by addition of an inhibitor to the electrolyte.

In the conventional type of phenol recovery process, involving steaming the phenolate solution, treatment with carbon dioxide and distillation, the losses, even in the laboratory, range from 14 to 20% while plant losses vary between 20 and 30%.

A Review of "West's Gas" Silver Jubilee Number

By John Terrace, M.Inst.C.E.

The disappointment which sometimes accompanies the perusal of publications attractive to the eye, and with a tempting list of subjects, will certainly not be felt by those who have the opportunity to obtain and peruse a copy of *West's Gas* Silver Jubilee Number. Well got up and with interesting illustrations, the articles which it contains will well repay the time spent in reading, and much of the information given is of such a nature and value that the volume may well form a permanent addition to the bookshelf of the Gas Engineer.

The Editor is to be congratulated on having secured the collaboration of such a number of men prominent in the Industry, and each a specialist in the subject with which he deals. Each reviews progress made during the last twenty-five years, and at the same time manages to impart considered views on the present position which are worthy of careful consideration. It is a reviewer's duty to let his readers know briefly what a book contains and how the subject is dealt with, so that they may decide whether the contents of the book are likely to be of interest to them, and this shall be done. But, as a keen advocate of the principle of giving credit where credit is due, the present reviewer would like first of all to express his appreciation of two references of this nature. One, however, is only implied—viz., by E. V. Evans when he writes: "The next important stage in development was introduced by the passing in 1920 of the South Metropolitan Gas Act and the Gas Regulation Act establishing the therm as the basis of charge." One would have liked to have seen a personal reference to Dr. Carpenter for his advocacy of this method of charging of which he was the pioneer. Probably its omission was due to Dr. Carpenter's well-known retiring disposition, but the writer feels it should have been put on record. The other is the reference by the President of The Institution of Gas Engineers to the pioneer work by Mr. J. E. Blundell on the extensive use of steaming in continuous vertical retorts.

The introduction to the volume is from the pen of the President of the Institution (Col. W. M. Carr) who gives a masterly summary of the whole field as seen from the point of view of a Gas Engineer working on the manufacturing and administrative side of the Industry. Carbonization is dealt with by J. F. West, C.B.E., J.P., who gives in clear sequence the various types of carbonizing plant used and in use. Students in gas engineering will find it most informative, and careful note should be made of many of the figures given if readers are not fortunate enough to secure a copy of the publication for filing. D. M. Henshaw's treatment of "Condensing," and P. Holmes's of "Washing Plant," provide a clear picture of these important processes, and a careful perusal of their remarks on the factors influencing them will well repay perusal and subsequent thought.

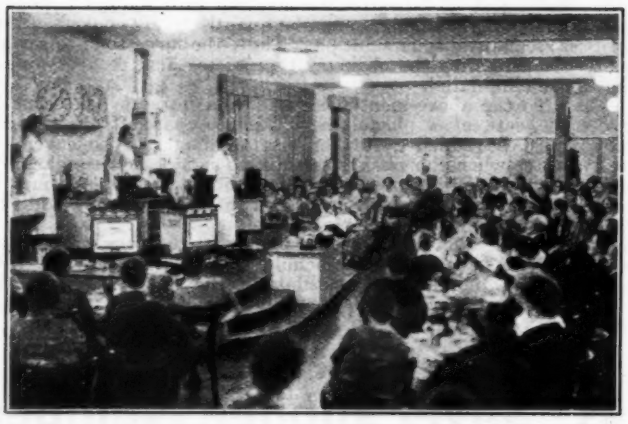
A most interesting account of "Exhausting and Boosting" is given by B. B. Waller, who uses illustrations of some fine old types of plant of the early days to demonstrate historical development, which should be preserved by the junior members of the profession, as opportunities of obtaining them are fast becoming very infrequent. Under the title of "Purifying" G. F. H. Beard contributes a most interesting account of the changes in purifier construction, and his views as to the trend of developments gives food for careful thought to the Gas Engineer, while his clear description of the backward rotation and reversal of flow of the gas in the working of purifiers should prove useful to the student.

On the subject of "Gas Storage," J. Winson Scott compares frame-guided, spiral, and waterless holders, and his views on the probable tendency of gasholder construction in the future will receive the careful consideration it deserves, coming from one so eminently qualified to express an opinion. "Station Meters" are dealt with by B. R. Parkinson, and "Consumers' Meters" by A Meter Maker. The former gives a thoughtful description and comparison of the types of meter used for measuring gas on the works and for large consumers, and his mastery of the subject is most evident. His whimsical remark "as to what degree of accuracy—what tolerance—can be guaranteed? There is no answer" is typical of the happy way in which he deals with his subject. The latter covers in an interesting manner the development from "lights" meters to the "small high capacity" meters of to-day, and makes a good case for the standardization of gas meters without undue interference which would hamper the meter maker in his choice of the most suitable materials. As he says, "The meter maker has to honour his five years' guarantee, and it is unlikely that for his own sake he will use anything but the finest materials in the execution of his work."

E. V. Evans' article on "Chemistry in the Gas Industry" will be "read, marked, learned, and inwardly digested" by all who have the opportunity, on account of his standing with such an important undertaking and long experience in developing methods of control in the manufacture of gas; and his description of part of the control exercised by the South Metropolitan Gas Company will be especially carefully studied. "Distribution," by H. J. Escreet, and "Sales," by H. D. Madden, will find ready readers on account of the importance of the subjects and the well-known qualifications of the authors. Kenneth Aird manages without going into too much detail to give an interesting account of recent changes in design and efficiency of "Cookers and Fires," and some of the points he mentions will be found useful to those who desire to have a good working knowledge of the goods they are selling. In dealing with the subject of "Lighting," Philip H. Sugg illustrates the changes in design of gas fittings for domestic use and draws attention to the advantages that have been placed in the hands of the Industry by the availability of silica glassware and switch lighting, and on public lighting his information on the B.S.I. Specifications will be welcome to many who may find it difficult to remember from references from time to time in the Technical Press exactly how this matter stands.

In "Water Heating," G. Ewart deals only with instantaneous heating of water. This he does in a most interesting manner, and concludes by pointing out that "gas has the great and special advantage over all other fuels in being able to provide its consumers with this ideal labour-saving and most economical form of really constant hot water supply at the 'Turn of the Tap.'" All who have, or hope to develop, an industrial load, will turn eagerly to Dr. E. W. Smith's article on "Industrial Gas," but lest any should not have sufficient interest in designs of furnaces, controlled and special atmospheres, and such details, to continue their reading to the end, the writer would recommend them not to miss the last part which deals with questions of research, testing, and the suggestions made by Messrs. Lacey and Masterman in their Paper to the Institution this year.

SOME IMPRESSIONS OF



The fine Demonstration Hall of the Hamburg Gas Undertaking

Continental Sales Methods

Mr. F. G. Brockway, who is, of course, the Engineer and Secretary of the Cleethorpes Gas Company, sends us the following interesting impressions of a recent visit to the Headquarters of the Hamburg Gas Undertaking.

The strongest impression left by a visit to the sales department of the Hamburg Gas-Works is that they have developed *SERVICE* to a higher pitch than is general in Great Britain and that they take energetic and effective steps to make it known.

I was received by Direktor Novakowski—elderly, reserved, but hospitable and obliging—with an air of old-world courtesy characteristic of his age and generation at their best. Later I was handed over to Engineer Mäyser—young, dynamic, efficient, and possessed of a sunny personality which has made him deservedly popular. He was formerly in control of the Grassbrook Works, but is now at Headquarters.

Quite apart from my own agreeable reception, the impressions I got of the staff were most favourable. One of my calls was at a busy hour, but nobody in the showroom seemed to have to stand about waiting for attention.

All classes of callers were treated with equal courtesy and respect. It was evident that their queries were answered with typical Teuton thoroughness. But their attention was directed to the selling points of the appliances on show without that tiresome importunity which sometimes characterizes the Briton's attempt to overcome his natural diffidence.

Showrooms.

The first floor of the building in the Kurze Mühren Strasse is almost entirely devoted to displays of domestic appliances such as cookers, water-heaters, home-laundry equipment, refrigerators, and central-heating outfits. "Bottled" gas for country use is also demonstrated here. No gas fires are displayed, as there is practically no sale for them in Germany.

There is almost no office equipment visible in the showroom, but the furniture for the comfort and convenience of callers is all that could be desired. There is an air about the place of brightness and cleanliness that is doubtless helped by the flat, cream paintwork, wide windows, and metal-framed glass partitions.

The utilitarian nature of the goods on show precludes any attempt at artistic effect, brisk efficiency and a sparkling tidiness being rather the keynotes. Yet some thought has obviously been given to the layout, for although a considerable range of types and finishes of stoves and fittings is on show they can be inspected and compared with a minimum of effort.

My only criticism is that—as in so many other places abroad—these premises are electrically lighted.

Appliances Displayed.

There were a few gas lighting fittings on show, but none quite so pleasing in design as some of the British makers' latest efforts. The Hamburg people do not appear to have anything like our ventilating ceiling lights.

The cookers over there are nearly all of the long-legged, squat-oven type with drop doors, the griller, if any, being enclosed. Those gleaming tap-rails and plated frame-members formerly so popular are now giving place to concealed tap-rails (with every tap a safety-tap) and all-enamel finishes. In general the oven capacities would seem to be smaller than those in favour here. Most of these stoves have a white enamel shelf secured to the legs under the oven about 6 in. from the floor, affording rigidity in construction and doubtless handy for the cook.

The water-heaters displayed were mostly finished in white enamel with chromium plated fittings. The instantaneous type predominated. Radiators are mainly of the cast-iron loop variety. I do not recollect seeing any panel heaters or those of the more decorative finish which have made their welcome appearance in this country.

Demonstrations and Private Tuition.

On the upper floors of the building are the executive offices, staff dining hall and kitchen, a large demonstration hall, and a school of housecraft.

The kitchen for the cooking of the staff meals is admirably equipped with the most modern large-scale culinary appliances. Here chefs prepare as many as 300 luncheons daily. I sampled the meat course which tasted as good as it looked. What a convenient and convincing way of demonstrating caterers' equipment.

The first things that strike one on entering the demonstration hall are its immense size, the fact that the platform is along one of the sides and not at the end, and that the audience is seated at small tables as in a modern lounge or café. I was told that 50,000 people attend the demonstrations there in the course of a year. The dais is tiered or stepped in the style beloved of Continental stage architects. An excellent feature—characteristically thorough from the points of service and propaganda—is that above the lecturer's platform, on the wall at the back, are three large dials by which the audience can see the actual quantity of gas consumed by the piece of apparatus being demonstrated.

Not the least interesting feature of this department is the large class-room containing six complete kitchen outfits for cookery, home laundry, and hot-water service. Here, under the tuition of pleasant, capable instructresses, the Hamburg housewife can have free individual training in kitchen-craft, including cookery, and may, if she wishes, take an examination and qualify for a diploma at the end of the course.

Nor is this all, for in addition to the foregoing the department employs thirty district demonstrators. During the period of my visit a speciality was being made of demonstrating the bottling of fruit and vegetables. A live institution this "Hamburger Gaswerke."

Publicity Material.

The publicity material, like the window-dressing at Hamburg, is striking and up-to-date, yet in good taste. The bulk of what I saw was evidently produced specially for this department and consisted of coloured folders illustrated by high-class photography.

A novelty is the invitation card tied to every appliance sent out on the district. This takes the attractive form of a brightly coloured cut-out (about 8 in. by 4 in.) of a young Hausfrau holding up an invitation, which begins "Dear housewife," drawing attention to the demonstration and tuition services available.

A less decorative but very practical example of printed propaganda is the leaflet headed "Cookery programme for the seven days of the week." This not only gives seasonable menus for families of four from Sunday to Saturday, but states the cost of the food for each day, the total quantity of gas required to cook it, and the fuel bill for the week—with an offer to prove it if you'll come to the Showrooms!

Window Displays.

The three large and very high windows were occupied, at the time of my visit, with gigantic scenas of the cut-out poster type. This is possibly the only kind of display

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GOOD HOUSEKEEPING MAGAZINE
Quality is the keynote of the "Calthorpe" Cooker. Attractive design, enduring enamel finish, and high standard of cooking efficiency have combined to make this Parkinson cooker the delight of many thousands of housewives. The "Ajusto" automatic oven heat control enables a complete meal to be cooked at one setting.
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London Showrooms: Terminal House, Grosvenor Gardens, S.W.1
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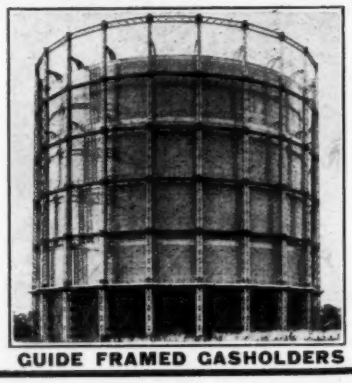
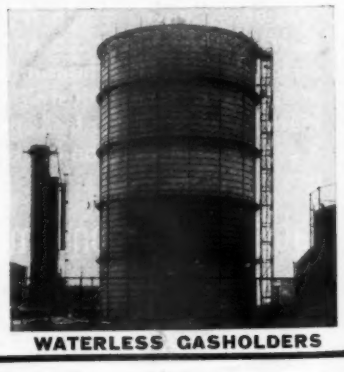
Telegrams—"Metrique, Lamb, London" Telephone No. 2412 Hop

Index glasses are now ¼-inch plate glass, so the index-door is not necessary.

SPIRAL GASHOLDERS

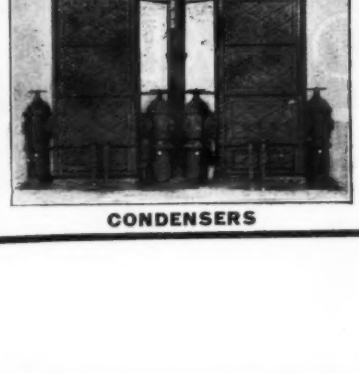


GUIDE FRAMED GASHOLDERS



WATERLESS GASHOLDERS

SAML. CUTLER & SONS LTD



CONDENSERS

39 VICTORIA ST. S.W.1

Telegrams: RETORTUS, SOWEST-LONDON

Phone: VIC. 8492

LONDON

Phone: EAST 1734

Telegrams: CUTLER MILLWALL LONDON

PROVIDENCE IRONWORKS MILLWALL, E.14

PURIFIERS

which could efficiently utilize the whole of the available window space in such cases, though not necessarily the only kind which could be made effective.

One (and in my view the most pleasing) was linked up with the aforementioned food-preserving campaign. It consisted of a huge cut-out figure of the inevitable young Hausfrau carrying a well-laden basket of fruit and vegetables. Behind her was a background one-half of which was a sunny, summer landscape and the other half a snow scene. There were no appliances shown and no fussy show-cards. Just this simple rhyming couplet boldly lettered on the background:

"IM SOMMER KOCHE EIN AUF GAS
DANN HAST DU AUCH IM WINTER WAS!"

The other two windows advertised respectively bath-water heating and gas ironing. The display for the latter merely consisted of the figure of a decorative and happy-looking housemaid wielding a huge gas-iron. In this case no lettering at all was used. The modernistic treatment was attractive in itself and the simple scene told its own story. Good technique, that.

The only piece of actual gas apparatus shown in these windows was in the water-heating display. It was fixed high up on the background in front of which a more than life-size ply-wood figure of a virile young girl with flaming red hair and dressed in a blue bathing costume was stood in an enamel bath (actual not scenic) gaily flourishing a shower spray attached by flex to the instantaneous heater. Not exactly a stunt window, but superlatively attractive.

One gathers that they alternate displays such as this with more formal exhibits of appliances.

INCREASED CROP YIELDS FROM

Soil Warmed by Coke-Fired Boilers

Remarkable instances of improved crop yields have been obtained at the Hertfordshire Institute of Agriculture in ground warmed by hot water pipes in conjunction with a coke boiler installation.

These carrots and onions were all planted at the same time, but those on the left were grown in soil warmed by a coke boiler installation.

Our readers will recall that last April we published a short article on the subject of soil warming by coke boilers, when it was suggested that this process not only increased and improved the crop yields, but also brought the crops on earlier in the season—a feature of particular importance to market growers.

We had the opportunity the other day of visiting the Hertfordshire Institute of Agriculture, near St. Albans, where an experimental coke boiler installation has been applied to a number of Dutch lights and open beds with very interesting results, as two of the accompanying photographs indicate.

Before describing this installation, it is as well to point out that soil warming should not be confused with soil heating, as comparatively low temperatures are normally employed. Experience and research have discovered that soil warming creates the most efficient temperature conditions for growing plants of several varieties, and the idea has been proved in practice to be economically sound. The following figures, which have been extracted from the 17th Annual Report of the Experimental and Research Station at Cheshunt, give some idea of the advantages to be gained from soil warming a crop of tomato plants:

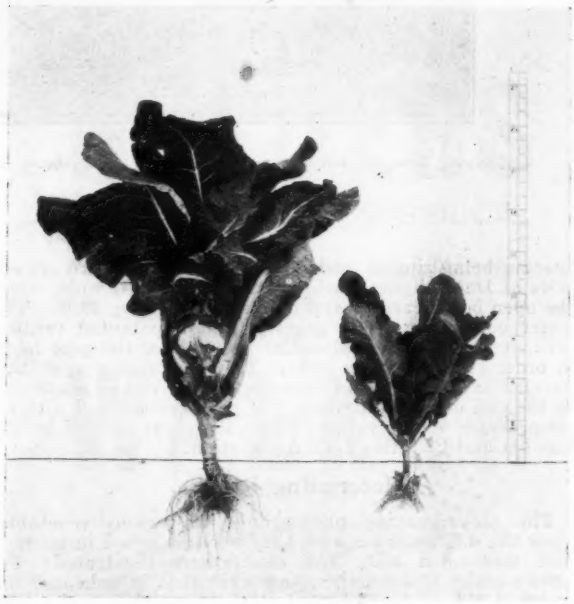
Plot No.	Temperature, ° F.	Yield of Tomatoes in Pounds per Plant.				
		May.	June.	July.	At the End of July.	At the End of the Year
3	62 (not warmed).	0·02	1·20	1·96	3·18	44·32
4	84 (warmed) . .	0·14	2·15	2·14	4·43	52·13
5	78 ,, . .	0·08	2·46	2·01	4·55	53·80
6	62 (not warmed).	0·08	2·03	1·53	3·64	42·71

These results show that crop increases of 23·6% and 19·1% had been obtained from the warmed plots for the whole season 1934. Up to the end of July of that year the increases were 33·4% and 30% respectively.

In the early development of the technique of soil warming electricity was utilized for experimental purposes, but it was found in practice that it cannot compete with coke. On the score of cost, too, it must be appreciated that few undertakings can at the moment supply gas at a figure which could provide soil warming as a practical proposition. But for coke there is a wonderful opportunity.

The St. Albans Plant.

The installation at the Hertfordshire Institute of Agriculture was arranged mainly for demonstration purposes;

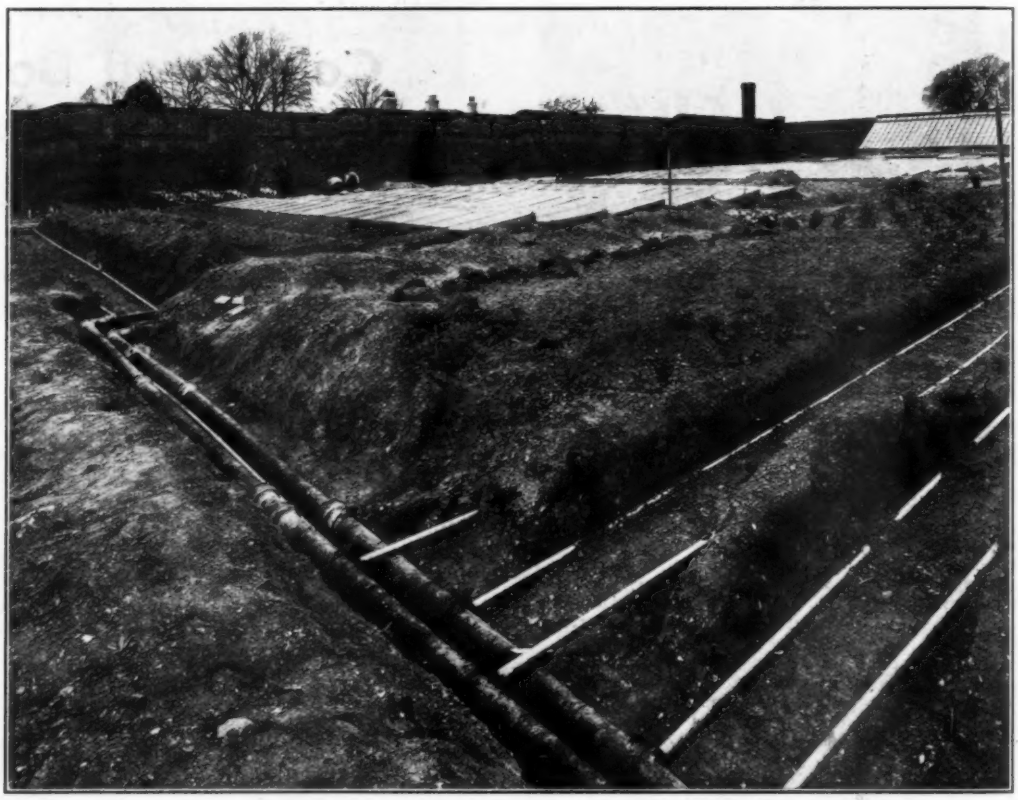


Cauliflowers planted at the same time in warmed and unwarmed soil respectively and photographed after the lapse of a certain period.

but the excellent practical results which have been obtained and the fact that students from all parts of the country have the opportunity of studying the system should in time do much to improve the market for coke in this direction.

The installation was planned and installed by the London and Counties Coke Association, and consists of a small boiler house in which is a magazine type coke boiler. The magazine holds a supply of fuel normally sufficient for a day, so that the plant requires very little attention. A thermostat placed in the warmed soil automatically controls the output of the boiler, which, it should be mentioned, is capable of considerably greater output than is called for at present. Flow and return pipes of 4-in. diameter carry the hot water to and from the beds, where 1-in. loops serve to heat the soil. The water leaves the boiler at approximately 180° F.

The plant serves both Dutch lights and an open bed, the pipes being laid at a depth of between 15 in. and 18 in. below the ground, this depth being sufficient to avoid damage due to digging. The pipes are set in pairs under each row of Dutch lights, being spaced at 2-ft. centres, the spacing being similar under the open beds. There are six rows of Dutch lights, each 50 ft. long by 4 ft. wide, while the open bed measures approximately 50 ft. by 60 ft. The water circulation is by gravity, and a patented venting arrangement has been fitted at the ends of the pipe loops in order to prevent air locks. This embodies a vent pipe parallel with the ground immediately above and connected to the end of each pipe loop, the vent being fitted with an air pressure release valve. The system was evolved by the London and Counties Coke Association.



Showing how the hot water pipes are laid underground for warming the soil at the Hertfordshire Institute of Agriculture.

Interesting Results.

The accompanying photographs of various vegetables show the difference between similar crops raised in warmed and unwarmed soil. The cauliflowers illustrated were grown under Dutch lights, and while that in unheated soil weighed 5½ oz., that planted at the same time and grown in warmed soil turned the scales at 2 lb. 10 oz. after the lapse of an identical period. The carrots and onions shown in the other illustration were grown in the open and gave similarly interesting results. The former weighed 6 oz. each in warmed soil as compared with 1¾ oz. in unwarmed, while the onions showed 2¼ oz. as compared with one-sixth of an oz. In each case these vegetables were planted on April 17 last and the photographs taken on June 12. The same number of carrots and onions (14 and 16 respectively) are in each bunch.

In England the majority of soil warming installations have been installed under glass, but there is a very wide field for the application of the system in open beds, or beds which are temporarily protected should conditions become severe. Very remarkable savings have been shown, the increased crop yields giving a return well in excess of the running costs of the heating installation; and there is no reason why certain crops for the raising of which a glasshouse has hitherto been necessary should not well be grown in the open with soil warmed by this means. The cost of a complete coke boiler installation to cover an acre would be less, it is estimated, than one-sixth of that of corresponding glasshouses, with a substantial return on capital expenditure in addition. The installation cost would naturally vary according to the site, but a rough figure of £500 is estimated as the cost of a coke boiler installation to serve an acre of ground by the soil warming process. Running costs are obviously dependent upon the weather conditions, but it has been proved conclusively that it is but a fraction of that involved in the operation of glasshouses covering a similar area.

The soil warming method of culture has given successful results from many different crops, such as melons, radishes, lettuces, early potatoes, and flowers, shrubs, bulbs, and cuttings—and the quality of the crop is definitely improved. A most important application is in the production of seasonal plants for an early market, such as tulips and hyacinths for the Christmas trade. Generally speaking, crops grown in warmed soil are remarkably immune from disease of any sort.

There should be an interesting future for gas coke in this direction, and the London and Counties Coke Association have done a good service to the Gas Industry in developing the use of coke boilers for this class of work.

Factory-made Lead Rings save time in the Trench!

More easily handled than molten lead, a pre-cast lead ring also makes a more efficient lead joint. To assemble the Stanton Mechanical Lead Joint, a factory-made lead ring is pushed over the pipe spigot, and two half-collars are placed into position. The operation is then completed by the tightening of four cast-iron setscrews—no caulking is necessary.

Embodied in the lead ring is a steel spring insertion ring which distributes the pressure so that the joint is effective throughout the full depth. The ring is positively held in position and cannot shrink, loosen or be displaced by "drawing" of the spigot.

Patent No. 404955, other patents pending

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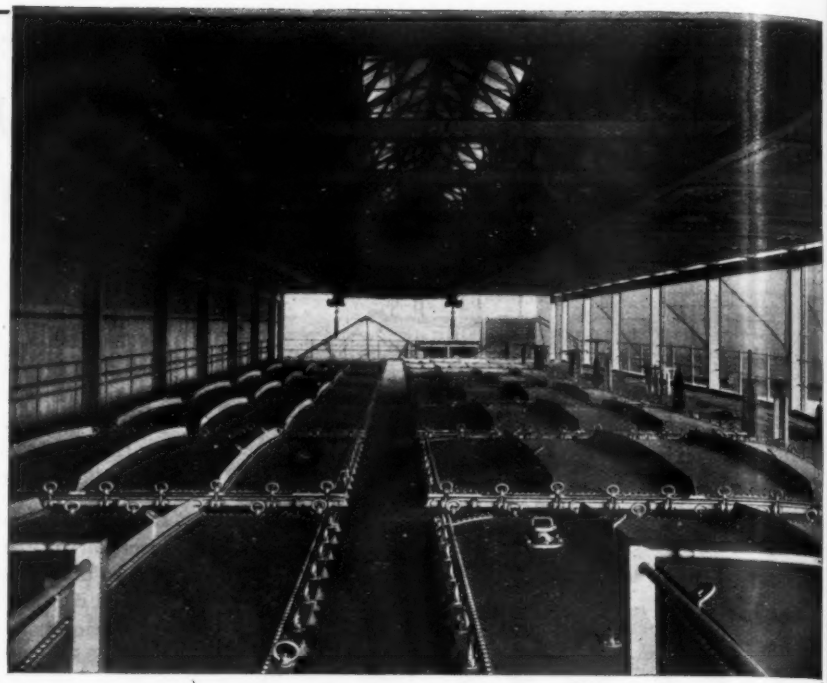

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A SYMPOSIUM ON THE
Utilization of Natural Gas Hydrocarbons

At a Meeting of the Division of Gas and Fuel Chemistry of the American Chemical Society held in San Francisco recently, the following aspects of the utilization of natural hydrocarbons were among the subjects discussed.

Industrial Utilization of Propane and Butane.

W. Z. FRIEND.

There was a 23·7% increase in marketed production of liquefied petroleum gases in 1934 over 1933, and a 73·0% increase in volume of these fuels used for industrial purposes during the same period. The principal industrial applications and processes to which propane and butane have been applied other than applications as chemical raw material were summarized. Industrial applications described included heat treatment of ferrous and non-ferrous metals; metal melting; baking, fruit ripening, and other uses in food industries; glass melting and annealing and other uses in ceramic industry; oxy-propane cutting of iron and steel; air heating and conditioning; textile plant applications; use as internal combustion engine fuel; railroad applications; use as refrigerants; use as solvents. A number of properties of propane and butane were discussed with special reference to their significance in industrial applications. A diagram of typical industrial plant storage, vaporizing, and regulation equipment was shown. Economics of supply and price were discussed. Attention was called to the possibility of a wide variety of applications in the same plant using the same propane first as solvent, then as refrigerant, and finally as fuel. An example was given of possible use in the operation of cold storage or ice manufacturing plants through vaporization of propane, then the use of the gas as a domestic cooking and heating service, and as a fuel for gas engine-generator sets furnishing electrical supply.

The Practical Solution to the Smoke Nuisance in Salt Lake Valley.

S. CLARK JACOBSEN and GEO. W. CARTER.

The fuel and smoke conditions existing at present in and about Salt Lake City, Utah, were discussed. This city has one of the most acute smoke problems of any community in the world. The menace of a smoke-polluted atmosphere to health, its cost to the public arising from damage to buildings, clothes, and household effects, and its relation to the efficient and economic utilization of coal were discussed. Data were presented to prove that the present available solid, liquid, and gaseous fuels did not adequately solve the problem. The authors recently investigated the adaptability of low-temperature carbonization to the production of a solid smokeless fuel from Utah coals. The characteristics of the resulting fuel offered a satisfactory solution to the problem of the complete elimination of smoke within Salt Lake Valley. This new fuel is easily ignitable, burns with a long flame, maintains a ready fire, provides 15% more available heat than raw coal, and the flue gases contain no soot or unburned volatile material and contain no visible smoke. The quantity and characteristics of the principal by-products obtained from the production of the smokeless fuel were described.

Low-Temperature Thermal-Chemical Treatment of Coal by the Records-Louttit Process.

JAMES E. LOUTTIT.

A description was given of the Records-Louttit process as exemplified in the plant of the Coalene Company at Tacoma, Wash., where various types of coal are treated for the production of smokeless solid fuels, tar-oils, and gases. The reactions are obtained by heat applied internally in specially designed retorts of simple construction, wherein thermal-chemical combinations of gases and oils result in a semi-hydrogenation under low pressures and at comparatively low temperatures. A description was given of the results obtained in the treatment of various lignites and bituminous coals. Certain types of fuels obtained from these coals have found a market in the electric furnace reduction of metals and alloys. Motor fuel is made from the primary tar-oil produced in the process by a specially developed method of distillation, together with other by-products of economic value.

Ignition Temperature of Coke and Air Required to Support Combustion.

C. R. HOLMES and J. D. DAVIS.

A method for determining the ignition temperature of coke and the minimum air supply required to support combustion was described. The method is applied to cokes made at carbonizing temperatures of 500°, 600°, 700°, 800°, 900°, 1,000°, and 1,100° C., and in charges sufficiently large to render their structure similar to that of industrial cokes. Cokes from coals covering the range of coking rank were studied. It was shown that both properties are very nearly straight-line functions of the carbonizing temperature, although the slopes of the lines differ for cokes made from different coals. The volatile content of coke is roughly related to its ignition temperature; that is, the higher the volatile matter, in general the lower the ignition temperature to be expected. For high-temperature cokes the ignition temperature tends to vary regularly with the reactivity, and this is in agreement with the findings of previous investigators; for low and medium temperature cokes, however, the relationship no longer holds. For large variations in ignition temperature there may be little or no variation in the reactivity. No direct relation between ignition temperatures of the cokes and rank of the coals from which they were made was found.

The Reactivity of Coke: An Improved Method for Determining the Reactivity of Coke in Carbon Dioxide.

D. A. REYNOLDS and J. D. DAVIS.

A method for determining the comparative reactivities of low, medium, and high-temperature cokes in CO_2 was described. Low-temperature cokes usually are much more reactive than those made at high temperatures and therefore it was necessary to select a reaction temperature and a time of heating that would render distinction between reactivities of high-temperature cokes possible and still not emphasize unduly differences in reactivity of those made at low temperatures. It was shown that all cokes evolve CO on being reheated to the high reaction temperatures ordinarily used, and therefore the amount of CO obtained in the products of the reaction cannot be taken without appropriate correction as a measure of reactivity. In the method described, a measured volume of CO_2 is passed through the sample, the excess not reacting is determined, and the difference representing that used is taken as the reactivity of the coke. It was shown further that low-temperature cokes are changed both chemically and structurally by reheating for even short periods to medium temperatures, and accordingly the time of heating was shortened and the reaction temperature adopted is as low as practical in the method adopted.

A New Method for the Definite Determination of the Reactivity of Solid Carbon.

C. C. FURNAS.

The term "reactivity" of carbon has long been used and several arbitrary and qualitative means of measurement have been proposed, but apparently the term has never been quantitatively defined or measured. The author proposed to measure reactivity in terms of the reaction rate constants for the equations: (1) $C + O_2 = CO_2$, and (2) $CO_2 + C = 2CO$. In other words "reactivity" consists of two distinct entities and cannot possibly be defined by a single constant, for the rate of reaction (2) has no direct connection with the rate of reaction (1). By starting with the differential equations of the rates of the above reactions and making a few simple but non-injurious assumptions, the author developed a very simple method for getting approximate rate constants for reactions (1) and (2) To obtain these constants it is only necessary to know the maximum percentage of CO_2 and its position in the bed for a solid fuel being burned with air. The reaction rate constants are computed from fuel bed data.

Centrifugally-Spun Iron Pipes

As mentioned in the "JOURNAL" for Aug. 28, the Clay Cross Company, Ltd., announce that their new plant for the production of centrifugally-spun iron pipes is now in production. Actually the plant has been in operation for some months, but the Company felt it advisable to make absolutely certain that the products were satisfactory and up to standard requirements before putting the pipes on the market.

In this particular process of manufacture the pipes are cast in accurately machined water-cooled moulds and are annealed in a furnace which, it is claimed, is the most up-to-date of its kind in the country. After annealing the pipes pass into a special scouring machine which ensures an absolutely smooth internal surface. The plant is designed for the production of 500 tons per week of all sizes from 4 in. up to 18 in. diameter in both 12 ft. and 18 ft. lengths, and for 3-in. pipes in 9-ft. and 12-ft. lengths.

The pipes are the equivalent of the British Standard Specification No. 78 of 1917, and they are subjected to the hydraulic test pressure specified for the particular class of pipe concerned. A series of tests have shown that the average tensile strength of the spun material is between 19 and 20 tons per sq. in.

The Clay Cross Company claim that the pipes are remarkable for the ease with which they may be machined.

Small Electric Tools

Messrs. Higgs Motors, Ltd., Witton, Birmingham, 6, announce a new range of small electric tools which they are now manufacturing on a large scale. At present the range consists of a self-contained tool grinder and a self-contained light drilling machine.

The bench grinder has been designed as a compact general purpose tool grinder and is of extremely robust construction. The motor is similar to the Higgs standard industrial type. It is of the totally enclosed pattern fitted with deep groove ball bearings in dust-excluding housings, and is rated at ½ H.P. at 2,800 r.p.m. The shaft is of ample size and is turned and ground from 35/40 tons tensile steel. Each end of the shaft is fitted with strong clamping plates and right and left-hand screwed nuts. Between the clamping plates are fitted two "general purpose" grinding wheels, each 7 in. diameter, one being ½ in. wide of fine grit and the other ¾ in. wide of coase grit. The motor can be supplied for either alternating or direct current. The shaft is arranged so that a removable taper screwed false nose to take polishing mops, &c., can be fitted at one end without removing the grinding wheel. The motor is mounted on a substantial cast iron base which carries the wheel guards, which are in accordance with Home Office Specification No. 7, as are also the easily adjustable tool or work rests.

The bench drilling machine has been developed to meet the need for a light yet strong bench drilling machine at a competitive price. The motor is rated at ¼ H.P. at 1,425 r.p.m. and it is mounted vertically on a strong stand with a machined cast-iron base. The height of the chuck above the base is capable of considerable adjustment and allows for a vertical movement controlled by the operating lever of approximately 3 in. The drill chuck will take drills up to ¼ in. diameter. The movement of the drill chuck is controlled by a long operating lever against a substantial coil spring which gives the effect of good balance and easy operation. The unit is capable of admitting work up to 8 in. diameter circles, and the height of the chuck from the base can be easily adjusted up to a maximum of 8 in. Both these units are well finished in stove-enamel black and are supplied complete with suitable built-in starting switch, drill chuck, and 9 ft. of C.T.S. flexible wire with earth connection.

The "Neocoke" Stove

Tested and approved by the London and Counties Coke Association, the "Neocoke" stove is now being manufactured by the London Warming Company, Ltd., Stove, Range, and Grate Makers, 2, Percy Street, Rathbone Square, W. 1.

The "Neocoke" stove (patent applied for) has been designed, it is claimed, on entirely new principles and is made for burning graded gas coke (nut size). Owing to its construction, the majority of the heat units are not wasted up the chimney as is the case with most coal fires, but it is given out by the stove, partly as beneficial radiant heat, and partly as warmed air from the body of the stove, which spreads evenly all over the room. The stove is constructed so that it also ventilates the room, and ensures the complete absence of any fumes.

During the daytime the doors are usually left open and as the front bars of the stove are louvred, the fuel cannot fall out. When the doors are open, the fire will burn for several hours without attention, and when they are closed, the draught is controlled by the circular ventilator in the ashdoor, so that the fire will easily remain alight all night. This ensures a room which is comfortably warm first thing in the morning, and if the door of the room is left open, the warmth will spread over the house. It also does away with the tiresome necessity of lighting the fire each morning. The "Neocoke" stove is fitted with an ashpan, and it also has a shaking bottom grate, so that all the ashes can be shaken out of the fire while the doors are closed, and thus no dust can escape into the room.

The fire is quickly lit by means of the gas poker, which is supplied with the stove, and it is inserted through the opening in the front bars, or with paper and wood in the usual way.

The "Neocoke" stove is claimed to be very economical, as it will comfortably heat a room 15 ft. square, being used with the doors open by day and shut by night, at a cost of 4d. per day of 24 hours.

The ratings and sizes of the two models, Nos. 1 and 2, are as follows:

No.	Size of Room. Cu.Ft.	Average Output. B.Th.U. per Hour.	Fuel Capacity.	Size of Firebox. Cu Ft.	Width of Fire. In.
1	2,000/2,500	6,000	8 lb.	0·65	12
2	3,000/4,000	9,000	10 ,,	0·80	13

No.	Height.	Width.	Depth.	Height to Top of Flue Outlet.	Overall Diameter of Flue Outlet.
	In.	In.	In.	In.	In.
1	24½	18½	12	19½	5
2	27	20	12	21½	5

Gas Undertakings' Results

Camborne.

The report of the Directors of the Camborne Gas Company for the year ended June 30, 1935, states that notwithstanding the mildness of the weather during last winter, they are pleased to report that there has been a slight increase in the sales of gas. The balance standing to the credit of profit and loss account amounts to £4,348, which the Directors recommend should be appropriated as follows: Dividend at the rate 2½% for the half-year ended June 30, 1935, making 5% for the year (less income-tax), £426, and carried to next account £3,922.

Cork.

The Directors' report to the shareholders of the Cork Gas Consumers' Company for the year ended June 30, 1935, states that, in comparison with the corresponding period last year, the accounts show a satisfactory increase in the sales of gas and residual products. After placing £1,642 to credit of the depreciation fund, the balance of profit and loss account is £4,532, with which the Directors propose to pay the usual dividend at the rate of 8% per annum.

Middlesbrough.

The annual report upon the accounts of the Middlesbrough Gas Undertaking for the year ended March 31, 1935, states that the total capital outlay amounted to £841,812, a net increase of £10,584 during the last financial year. This increase is accounted for as follows: Remodelling C.W. Gas Plant, &c., £9,844; mains, £9,993; cookers, £3,628; and No. 7 gasholder, £11,954; which less cost of No. 5 gasholder written off, £24,835, makes a total of £10,584. The gross profit was £39,006, as against £41,331 for the previous year, a decrease of £2,326. The income from the sale of gas amounted to £123,868, as against £121,238 for the previous year, an increase of £2,630. This increase in revenue was due to an increase of 25,541,700 cu.ft. in the volume of gas sold, resulting from new and increased business in the industrial and central heating loads. In addition, discounts allowed fell by £225. Hire-purchase and miscellaneous receipts increased by £230 from £16,074 to £16,304. The total revenue of the Undertaking thus showed an increase of £2,860. The expenditure for the year was £101,167, as compared with £95,981 for the previous year, an increase of £5,185. This increase is accounted for by increases in manufacturing costs

(including gas purchased) of £2,081, distribution costs (including hire purchase redemption) of £2,122, and general establishment expenses of £1,399, less sundry savings amounting to £366. The gross profit for the year, amounting to £39,006, has been transferred from the revenue account. Against the net revenue account have been debited interest and redemption charges, amounting to £22,591, and the balance of £16,414 then carried to the appropriation account. The amount available for disposal was £16,414; of this sum £3,867 has been applied in aid of capital expenditure, leaving a balance of £12,547, which, after deducting an amount equivalent to 1¼% of the outstanding debt, to be transferred in aid of the rates, has been transferred to the sinking fund in redemption of debt. Gas purchased and manufactured totalled 1,201,626,000 cu.ft., against 1,153,917,000 cu.ft. in 1933-34, and gas sold was 1,128,946,700 cu.ft., against 1,103,405,000 cu.ft. last year. The number of consumers has increased from 34,768 to 35,882.

Stalybridge.

The annual report on the working of the Stalybridge Gas Department for the year ended March 31, 1935, shows a gross profit of £5,476 and a net loss of £1,072 compared with a gross profit of £7,840 and a net profit of £487 for the previous year. The expenditure for the year amounted to £28,251, whereas last year there was an expenditure of £25,373; the increase of £2,878 is mainly due to the renewal of coke screening plant and other extraordinary expenditure. The total income from all sources was £33,727, compared with £33,214 for last year. The expenditure against net revenue account amounted to £6,717, the deficiency of £1,072 being carried to appropriation account, which now shows a balance of £2,654. The gas sold amounted to 140,819,000 cu.ft., compared with 142,567,700 cu.ft. for last year, showing a decrease of 1,748,700 cu.ft., equal to 1·12%; the revision in rating consumption of lamps for public lighting being responsible for 55·3% of the total reduction. The gas sent out as registered amounted to 156,253,414 cu.ft., compared with 153,508,000 cu.ft. for the year preceding and shows unaccounted-for gas equal to 9·81%, compared with 7·77% for last year. The net income amounted to £4,001. The coke available for sale per ton of coal carbonized was 8 cwt. Tar sold amounted to 128,200 gallons, equal to 641 tons, and together with the benzole sold the net receipt after making allowance for last year's stocks was £1,944. This figure shows a return of 36·11d. per ton of coal carbonized; the production of tar shows 10·24 gallons per ton of coal carbonized. The total number of meters now in use is 7,376—4,847 prepayment and 2,529 ordinary. In the total is shown an increase in the number of meters in use of 23, made up of an increase in prepayment meters of 56 and a decrease in ordinary meters of 33. The amount of gas used for public lighting was 7,559,900 cu.ft., and there are in use 522 clock controlled lamps on this district.

Stretford.

The annual report for the year ended March 31, 1935, of the Stretford and District Gas Board states that the total quantity of gas made was 4,384,877 therms actual or 4,350,585 therms calculated on basis of declared calorific value of 500 B.Th.U. per cu.ft., and the quantity of gas sold was 4,010,079 therms, an increase of 363,643 therms, or 9·97%, as compared with the previous year ended March, 1934. The increase in the numbers of consumers is 2,272, or 9·13% during the year. The volume of gas sold during the year was 812,015,800 cu.ft., as compared with 729,287,000 cu.ft. during the year ended March, 1934. The consumption of gas has been in the following proportions: Ordinary meters 27·97%, prepayment meters 24·64%, industrial purposes on special rates 35·05%, public lighting 4·51%, used in works, offices and showrooms 1·65%, unaccounted-for 6·18%. The total number of consumers at March 31, 1935, was 27,166, of which 12,601 have ordinary meters and 14,565 have prepayment meters, the increase in the number of consumers during the year being 2,272, of these 519 are ordinary meter consumers and 1,753 prepayment meter consumers. The coal carbonized during the year was 63,977 tons. The cost of distribution was £54,198, as compared with £43,708 last year. The mains have been considerably extended during the year to supply housing schemes in Stretford, Sale, Ashton-on-Mersey, and Flixton. The total length of main pipes laid during the year for extensions and improvement of the supply was 17,191 yards, and the number of service pipes to premises, 1,924. The total length of mains laid at March 31, 1935, was 178 miles, 632 yards. The average price realized for gas per therm sold was 7·67d. net. This compares with 8·02d. net per therm sold for the previous year. A two-part tariff system of charge was offered to domestic consumers as from Oct. 1, 1934. During the six months ended March 31, 1935, agreements were completed by 3,424 consumers, of whom 1,567 were consumers by ordinary meter and 1,857 consumers by prepayment meter. The total income on revenue account is £202,197, and the total expenditure on revenue account amounts to £150,397. The net result shows a gross balance on revenue account of £51,800, compared with £63,323 in 1934, a decrease of £11,523. The interest and sinking fund charges, after deduction of contribution of £2,174 from unemployment grants committee towards loan interest charges, amounted to £39,642, and £3,150 has been provided for income-tax, leaving a credit balance on the net revenue account for the year of £9,008. To this amount is added the credit balance standing in the appropriation account at March 31, 1934—viz., £34,370, making the total balance in the appropriation account at March 31, 1935, £43,378. A balance of £18,841 has been carried forward.

[*Further Undertakings' Results will be found on p. 522.*]

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(BRANCH OF METERS LTD.)

OUR MAIN TAPS
ARE UNSURPASSED
FOR QUALITY.

PRICES RIGHT.

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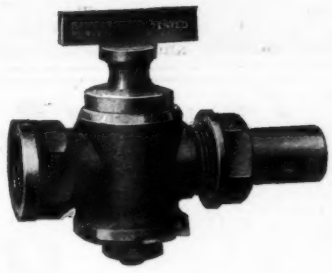

No. 119.

Makers of

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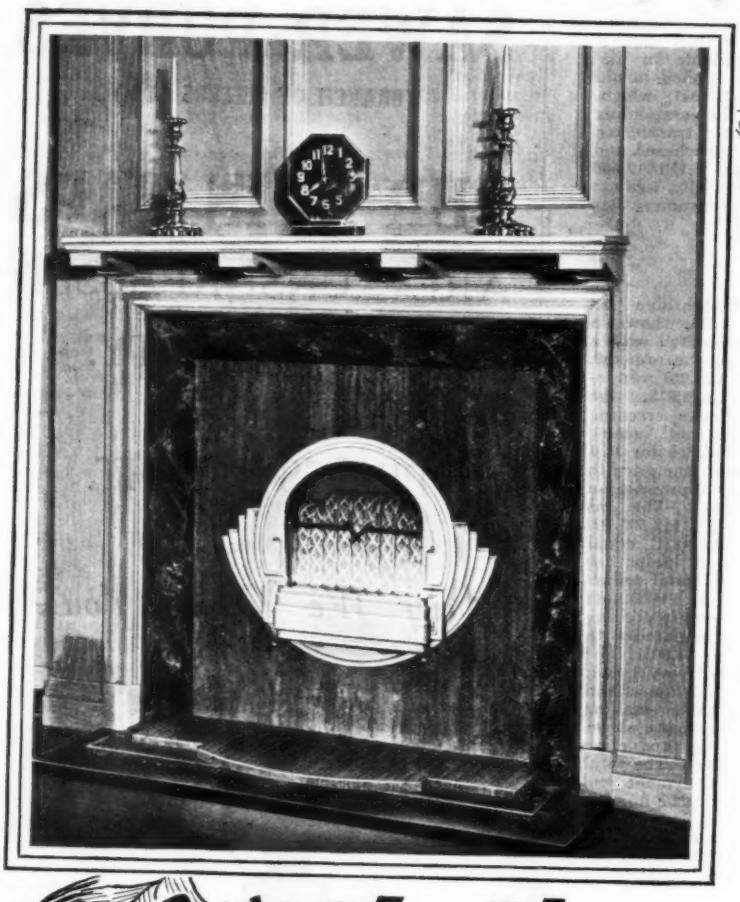
GRAMS: SAWER MANCHESTER



With the end of summer . . .

With the end of summer gas undertakings will be giving increased attention to heating apparatus.

The MAIN range of appliances will be found to cover all requirements. There are Fires which can be either built in to wall openings with panel surrounds, or fitted to existing fire-places having brick or cast-iron surrounds. There are also Fires which can be fixed by means of "plug-in" connections to provide gas heating alternatively in several rooms, from one fire only. Floor-type and wall-type Radiators are also available.

All these appliances embody the MAIN features of sound design and simplified construction, with interchangeable working parts. They provide efficient and effective heating. Initial costs are moderate and maintenance low.

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Gas Markets and Manufactures

Stock Market Report

(For Stock and Share List, see later page)

In view of the International situation and the anxiety as to the outcome of to-day's meeting at Geneva, it was not surprising that the general investor has adopted a "wait and see" policy, with the result that last week's business was on the small side with spasmodic price movements. British Funds fluctuated considerably, and with the exception of 3½% Conversion loan all closed lower on the week. Home rails weakened and despite a further batch of good reports there were no outstanding features in the Industrial Market.

The Gas Market was similarly affected as regards the volume of business, though prices generally were well maintained while a few quotations were moved up. Tottenham ordinary headed the list with a gain of 4 to 151½; Uxbridge ordinary and Commercial 3% debenture both rose 2 points; and on the local Exchange Newcastle units hardened 3d. to 25s. 9d. Apart from *ex* div. reductions, the only reactions of note occurred in Imperial Continental, which, by a narrowing of the margin from 10 to 5 points, closed 2½ points lower on the week; Liverpool ordinary fell 3 on the local Exchange to 136; and South Metropolitan ordinary finally closed 2 points down at 131½.

The United Kingdom Gas Corporation, with which is associated the Caledonian Gas Corporation, having a combined authorized capital of £2,400,000, is seeking to obtain control of the Scarborough Gas Company. It is understood that the terms consist of an offer to buy the preference shares of the Company on the basis of £122 2s. 6d. in cash, or 112 fully-paid 4½% £1 cumulative preference shares in the Corporation *plus* 16s. 3d. in cash for each £100 of the preference capital. The Company's ordinary stockholders are also being offered similar shares, or preferred ordinary shares, in exchange for their holdings.

Current Sales of Gas Products

The London Market for Tar Products.

Sept. 2.

Prices of tar products remain as last quoted, namely:
Pitch, 33s. to 34s. per ton f.o.b.
Creosote, about 6d. per gallon.
Refined tar, 4d. per gallon in bulk at makers' works.
Pure toluole, 2s. 2d. to 2s. 3d.; pure benzole, 1s. 7d. to 1s. 8d.; 95/160 solvent naphtha, 1s. 5d.; and 90/160 pyridine, about 4s. 6d. to 4s. 9d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

Sept. 2.

The average prices of gas-works products during the week were: Gas-works tar, 18s. to 23s. Pitch—East Coast, 31s. to 33s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 31s. to 33s.* Toluole, naked, North, 1s. 8d. to 1s. 9d. Coal-tar crude naphtha, in bulk, North, 6¾d. to 7d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 5½d. Heavy naphtha, North, 9½d. to 10½d. Creosote, *ex* works, in bulk, North, liquid and salty, 5½d. to 5¾d.; low gravity, 5d. to 5⅛d.: Scotland, 5d. to 5⅛d. Heavy oils, in bulk, North, 5d. to 5⅛d. Carbolic acid, 60's, 1s. 11d. to 2s. Naphthalene, £10 to £11. Salts, 60s. to 75s., bags included. Anthracene, "A" quality, 2½d. to 3d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Aug.* 31.

A little more liveliness is noticeable in this district, but on the whole, prices are unchanged on the week's trading.

Crude gas-works tar.—The actual value is 26s. to 28s. per ton *ex* works in bulk.

Pitch remains featureless with value at about 30s. per ton f.o.b. Glasgow for export, and about 30s. per ton *ex* works in bulk for home trade.

Refined tar is still available at 2d. per gallon f.o.r. in buyers' packages, with abundant supplies on hand.

Creosote oil continues a bright feature and prices are steady. B.E.S.A. Specification, 5⅛d. to 5⅜d. per gallon; low gravity, 5¼d. to 5½d. per gallon; and neutral oil, 5¼d. to 5½d. per gallon; all f.o.r. in bulk.

Cresylic acid is in slightly better demand, but prices remain easy. Pale, 97/99%, 1s. 1½d. to 1s. 2½d. per gallon; dark, 97/99%, 1s. to 1s. 0½d. per gallon, and pale, 99/100%, 1s. 2½d. to 1s. 3½d. per gallon; all *ex* works naked.

Crude naphtha.—Available supplies continue to secure 4½d. to 5d. per gallon f.o.r., according to quality and district.

Solvent naphtha.—90/160 grade is 1s. 3½d. to 1s. 4d. per gallon, and 90/190 heavy naphtha is 10d. to 11d. per gallon.

Motor benzole is only available in small quantities locally at 1s. 3½d. to 1s. 4d. per gallon in bulk at makers' works.

Pyridines.—90/160 grade is 5s. 6d. to 6s. per gallon, and 90/140 grade 6s. to 6s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole . . .	0 9½	to	0 10	per gallon at works
Motor ,, . . .	1 3	,,	1 3½	,, ,, ,,
90% ,, . . .	1 4	,,	1 4½	,, ,, ,,
Pure ,, . . .	1 7½	,,	1 8	,, ,, ,,

Contracts Advertised To-Day

Cookers.

Port Talbot Gas Department. [p. 526.]

Purifier Boxes, &c.

Stretford and District Gas Board. [p. 526.]

Trade Notes

"Staveley" Pipe Stock List.

The September Pipe Stock List has recently been published by the Staveley Coal and Iron Company, Ltd., Near Chesterfield, dealing with the Company's sand spun and vertically cast pipes.

Weir Auxiliary Machinery.

We have received from Messrs. G. & J. Weir, Ltd., Cathcart, Glasgow, a copy of their special catalogue of turbo-feed pumps, electrofeeders, and turbo-electric feed pumps. The fine degree of workmanship that is employed in the construction of these specialities cannot do otherwise than create every confidence in the products of Messrs. G. & J. Weir, Ltd.

Further Gas Undertakings' Results

Stockport.

The annual report of the Stockport Gas Department for the financial year ended March 31, 1935, states that there has been a slight increase in the gas sold of 297,900 cu.ft., or 1,341 therms. The gas manufactured totalled 1,196,260,000 cu.ft., against 1,223,793,000 cu.ft. last year. The average calorific value of the gas supplied during the year has been 451 B.Th.U. per cu.ft., the prescribed standard being 450 B.Th.U. per cu.ft. The revenue income during the year was £245,624, compared with £239,939 last year. The expenditure was £195,223, compared with £192,964, giving an increase of £5,685 and £2,260 respectively. The trading profit was £50,401, against £46,975 for the previous period. Including the amount of £4,221 carried forward and the addition of £6,250 from income-tax reserve fund and £996 from sundry rents, &c., the gross profit amounts to £61,867. The revenue from the sale of gas has increased from £165,480 to £165,623. The quantity of coal carbonized during the year was 63,445 tons. The total quantity of oil used in the carburetted water gas plant during the year was 61,721 gallons. An increased income of £2,541 was shown by residuals. The gas unaccounted for amounts to 3·70% of the total make. The considerable length of 29,172 yds. of mains of various sizes was laid during the year. The number of consumers on March 31 was 43,954. Of these 20,914 were supplied through ordinary meters and 23,040 through prepayment meters. During the year there was an increase of 1,713 new consumers. In this connection it is of interest to note that 15,127 changes of tenancy took place during the year. The sales of all classes of appliances through the Show Room was £41,681 15s., as against £43,700. A benzole plant capable of dealing with five million cu.ft. of gas per day has been erected. This was put in operation on Jan. 1, 1935, and during the last quarter of the financial year it produced 25,102 gallons of benzole.

For increased efficiency in every process related to gas manufacture . . . .

THE WEST SYSTEMS

OF CARBONIZATION, FUEL-HANDLING AND TREATMENT

The West organization has co-operated with leading gas undertakings of 22 countries in schemes of modernization, plant renewal and extension. Most of the world's principal gas coals have been treated in our Research Gas Works

GLOVER-WEST VERTICAL RETORTS

WESTVERTICAL CARBONIZING CHAMBERS

A MEMBER COMPANY OF THE

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BREEZE-BURNING PRODUCERS AND WASTE-HEAT RECOVERY PLANT
MODERN METHODS OF COAL & COKE HANDLING & TREATMENT

WEST'S GAS IMPROVEMENT COMPANY, LTD.

MANCHESTER: Albion Ironworks, Miles Platting. LONDON: Regent House, Kingsway, W.C.2

STOCK AND SHARE LIST

Official Quotations on the London and Provincial Stock Exchanges

Issue. £	Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations, Aug. 30.	Rise or Fall on Week.	Transactions, Lowest and Highest Prices During the Week.
1,551,868	Stk.	Mar. 11	7	7	Alliance & Dublin Ord. ...	132—142	...	...
374,000	,,	June 24	4	4	Do. 4 p.c. Deb.	90—100	...	99⅞—99⅞
557,655	,,	Aug. 12	7	7	Barnet Ord. 7 p.c.	165—170	...	...
300,000	,,	Apl. 8	1/4⅓	1/9⅔	Bombay, Ltd.	1⅛—1⅜	−1/16	30/—31/-
178,480	Stk.	Aug. 12	9½	9½	Bournemouth sliding scale ...	222—232	...	...
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	168—173	...	169
489,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	147—152	...	...
50,000	,,	June 24	3	3	Do. 3 p.c. Deb. ...	85—90	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	106—111	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	123—128	...	...
357,900	,,	Aug. 12	7½	7½	Brighton, &c., 6 p.c. Con. ...	170—175	...	...
649,955	,,	,,	6½	6½	Do. 5 p.c. Con. ...	150—155	...	...
205,500	,,	,,	6	6	Do. 6 p.c. B. Pref.	142—147	...	...
1,487,500	,,	July 8	5	5	Bristol, 5 p.c. max.	120—122*a*	...	...
120,420	,,	June 7	4	4	Do. 1st 4 p.c. Deb. ...	102—104*a*	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	101—103*a*	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	127—130*a*	...	...
855,000	,,	Mar. 11	7	8	British Ord.	154—159	...	155
100,000	,,	June 7	7	7	Do. 7 p.c. Pref.	160—165	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. "B" Cum. Pref.	112—117	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	109—114	...	...
200,000	,,	,,	...	17/6⅔	Do. 3½ p.c. Red. Deb. ...	99—101	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	...
100,000	10	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1—3	...	20/-
150,000	Stk.	June 24	4½	4½	Do. 4½ p.c. Deb. ...	83—88	...	...
626,860	,,	July 22	6	6	Cardiff Con. Ord.	127—132	...	...
237,860	,,	June 7	5	5	Do. 5 p.c. Red. Deb.	107—112	...	...
157,150	,,	Aug. 12	6½	5	Chester 5 p.c. Ord.	109—114*b*	...	...
98,936	£	Mar. 25	2/-	2/-	Colombo, Ltd., Ord.	1⅜—1⅞	...	36/4½
24,500	£	,,	1/4⅜	1/4⅜	Do. 7 p.c. Pref. ...	20/6—22/6	...	...
609,204	£	Mar. 25	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	20/6—22/6	...	...
296,053	£	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	26/—28/-	...	...
1,775,005	Stk	Aug. 12	6	5	Commercial Ord.	101—106	...	102—103½
620,000	,,	June 7	3	3	Do. 3 p.c. Deb. ...	87—92	+2	90—92
286,344	,,	Aug. 12	5	5	Do. 5 p.c. Deb. ...	121—126	...	...
807,560	,,	Aug. 12	7	7	Croydon sliding scale... ...	152—157	...	...
569,590	,,	,,	5	5	Do. max. div.	113—118	...	115½
620,385	,,	June 24	5	5	Do. 5 p.c. Deb.	123—128	...	...
542,270	,,	Aug. 12	10	7	Darby Con.	180—190*c*	...	...
55,000	,,	June 24	4	4	Do. 4 p.c. Deb.	100—105*c*	...	...
239,000	,,	Aug. 12	5	5	East Hull Ord. 5 p.c. ...	106—111	...	...
181,625	,,	Aug. 12	6	6	East Surrey Ord 5 p.c. ...	129—134	...	...
175,609	,,	June 7	5	5	Do. 5 p.c. Deb. ...	123—128	...	...
1,002,180	,,	Mar. 11	†	†7	European, Ltd.	170—180	...	...
19,313,481	,,	Aug. 12	5⅔	5⅔	Gas Light & Coke 4 p.c. Ord.	27/6—28/6*f*	...	27/5⅛—28/0⅜
2,600,000	,,	,,	3⅓	3⅓	Do. 3⅓ p.c. max.	88—91	...	90⅛—91
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	108—111	...	109—110
8,602,497	,,	June 7	3	3	Do. 3 p.c. Con. Deb. ...	91—94	...	92½—94
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	115—118	...	...
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	113—116	...	113⅓—115
270,466	,,	Aug. 12	6	6	Harrogate New Cons. ...	132—137	...	...
140,000	£	Mar. 25	1/7½	1/7½	Hongkong & China, Ltd. ...	1⅛—1⅜	...	...
213,200	Stk.	Aug. 12	6	6	Hornsey Con. 3½ p.c....	130—135	...	...
5,600,000	,,	May 13	10	14	Imperial Continental Cap. ...	210—215	−2½	210—214
223,130	,,	July 22	3½	3½	Do. 3½ p.c. Red. Debs.	91—96	...	...
285,242	,,	Aug. 12	8½	8½	Lea Bridge 5 p.c. Ord. ...	175—180	...	...
2,167,410	,,	Aug. 12	6	6	Liverpool 5 p.c. Ord.... ...	135—137*b*	−3	...
245,500	,,	June 7	5	5	Do. 5 p.c. Red. Pref. ...	105—110*b*	...	...
306,083	,,	July 8	4	4	Do. 4 p.c. Deb.	103—106*b*	...	...
165,736	,,	Aug. 26	10	8	Maidstone 5 p.c. Cap. ...	182—192*	−3	...
63,480	,,	June 24	3	3	Do. 3 p.c. Deb. ...	82—87	...	...
75,000	,,	May 27	†10	†10	Malta & Mediterranean ...	212—222	...	—
392,000	—	Apl. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	100—105	...	...
231,978	Stk.	Aug. 12	5	5	M. S. Utility "C" Cons. ...	108—113	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	101—106	...	...
360,075	,,	June 24	4	4	Do. 4 p.c. Deb. ...	103—108	...	105—106
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	123—128	...	...
125,000	—	July 1	3½	3½	Do. 3½ p.c. Rd. Rg. Bds.	97—100	...	...
675,000	,,	June 24	†3	†3	Montevideo, Ltd.	48—53	−2½	...
2,061,315	,,	Aug. 12	5⅔	5	Newcastle & Gateshead Con.	25/3—26/3*df*	+-/3	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	107—108*d**	+½	...
776,706	,,	June 7	3½	3½	Do. 3½ p.c. Deb. ...	100—101*d*	+½	...
277,285	,,	Oct. 8	5	5	Do. 5 p.c. Deb. '43 ...	105—107*d*	...	...
274,000	,,	Aug. 12	5	5	Newport (Mon.) 5 p.c. max....	113—118*e*	...	...
225,000	,,	Aug. 12	7½	7½	North Middlesex 6 p.c. Con.	162—172	...	...
396,160	,,	Aug. 12	5	5	Northampton 5 p.c. max. ...	105—110	...	...
300,000	,,	Apl. 29	†9	†7	Oriental, Ltd.	168—173	...	...
416,617	,,	June 7	8	8	Plym'th & Stonehouse 5 p.c.	162—167	...	...
504,416	,,	Aug 12	8½	8½	Portsm'th Con. Stk. 4 p.c. Std.	170—175	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	108—113	...	...
114,000	,,	July 22	5	5	Preston 5 p.c. Pref.	106—111	...	...
321,961	£	Apl. 8	...	...	Severn Val. Gas Cor. Ld. Ord.	22/—23/-	...	22/9—23/3
319,510	£	Mar. 25	...	...	,, 4½ p.c. Cum. Pref.	22/—23/-	...	22/9
1,736,968	Stk.	Aug. 26	6	6	Sheffield Cons.	140—142*e**	−2	...
95,000	,,	June 24	4	4	Do. 4 p.c. Deb.	102—104*e*	...	...
133,201	,,	Aug. 12	5	8⅓	Shrewsbury 5 p.c. Ord. ...	139—144	...	...
90,000	£	May 27	‡3	‡3	South African	3—4	...	...
1,061,779	£	May 13	1/2§	1/2§	South East'n Gas Cn. Ld. Ord.	28/—29/-	...	...
845,016	£	Mar. 11	-/10½	-/10½	Do. 4½ p.c. Red. Cum. Pref.	22/6—23/6	...	...
450,000	Stk.	Aug. 12	4	4	Do. 4 p.c. Red. Deb. ...	100—103	...	...
6,709,895	,,	Aug. 12	6⅓	5	South Met. Ord.	129—134	−2	130—134
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf. ...	147—152	...	149—152
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf. ...	107—110	...	...
1,895,445	,,	June 24	3	3	Do. 3 p.c. Deb. ...	88—91	...	89⅜—90½
1,000,000	,,	July 8	5	5	Do. 5 p.c. Red. Deb....	112—117	...	116½—117
209,820	,,	Aug. 12	8½	8½	South Shields Con.	171—173*d*	...	...
1,543,795	,,	Aug. 12	6	6	South Suburban Ord 5 p.c. ...	128—133	...	131½—132
512,825	,,	,,	5	5	Do. 5 p.c. Pref. ...	121—126	...	...
500,000	,,	,,	4	4	Do. 4 p.c. Pref. ...	105—110	...	...
888,587	,,	June 7	5	5	Do. 5 p.c. Deb. ...	123—128	...	...
250,000	,,	,,	4	4	Do. 4 p.c. Deb. ...	105—110	...	...
647,740	,,	Aug. 12	5	5	Southampt'n Ord. 5 p.c. max.	115—120	...	...
121,275	,,	June 7	4	4	Do. 4 p.c. Deb.	100—105	...	...
350,000	,,	Aug. 12	5½	5½	Swansea 5½ p.c. Red. Pref. ...	113—118	...	114—116
200,000	,,	June 7	6½	6½	Do. 6½ p.c. Red. Deb. ...	98—103	...	...
1,076,490	,,	Aug. 12	6½	6½	Tottenham and District Ord.	149—154	+4	149— 52
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	130—135	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	...
334,615	,,	June 7	4	4	Do. 4 p.c. Deb. ...	101—106	...	...
369,774	,,	Aug. 12	7	7	Uxbridge, &c., 5 p.c. ...	150—155	+2	...
108,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	118—123	...	...
1,326,700	,,	Aug. 12	7	7	Wandsworth Consolidated ...	155—160	...	150—160
1,371,373	,,	,,	5	5	Do. 5 p.c. Pref. ...	121—126	...	...
1,317,964	,,	June 7	5	5	Do. 5 p.c. Deb. ...	125—130	...	...
338,300	,,	,,	4	4	Do. 4 p.c. Deb. ...	102—107	...	...
158,400	,,	Aug. 12	6*g*	5	Winchester W. & G. 5 p.c. Con.	114—119	...	...

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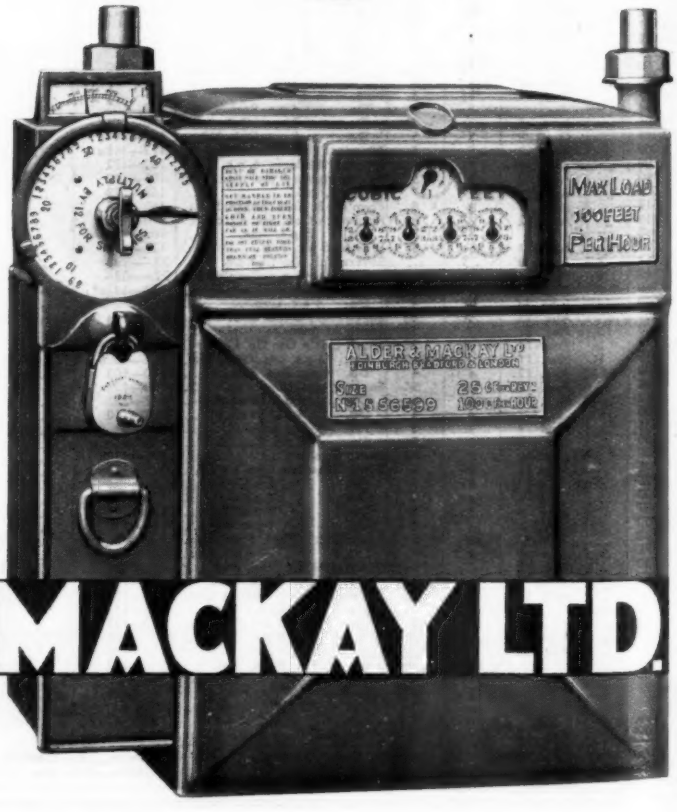

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